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ISSUE 7

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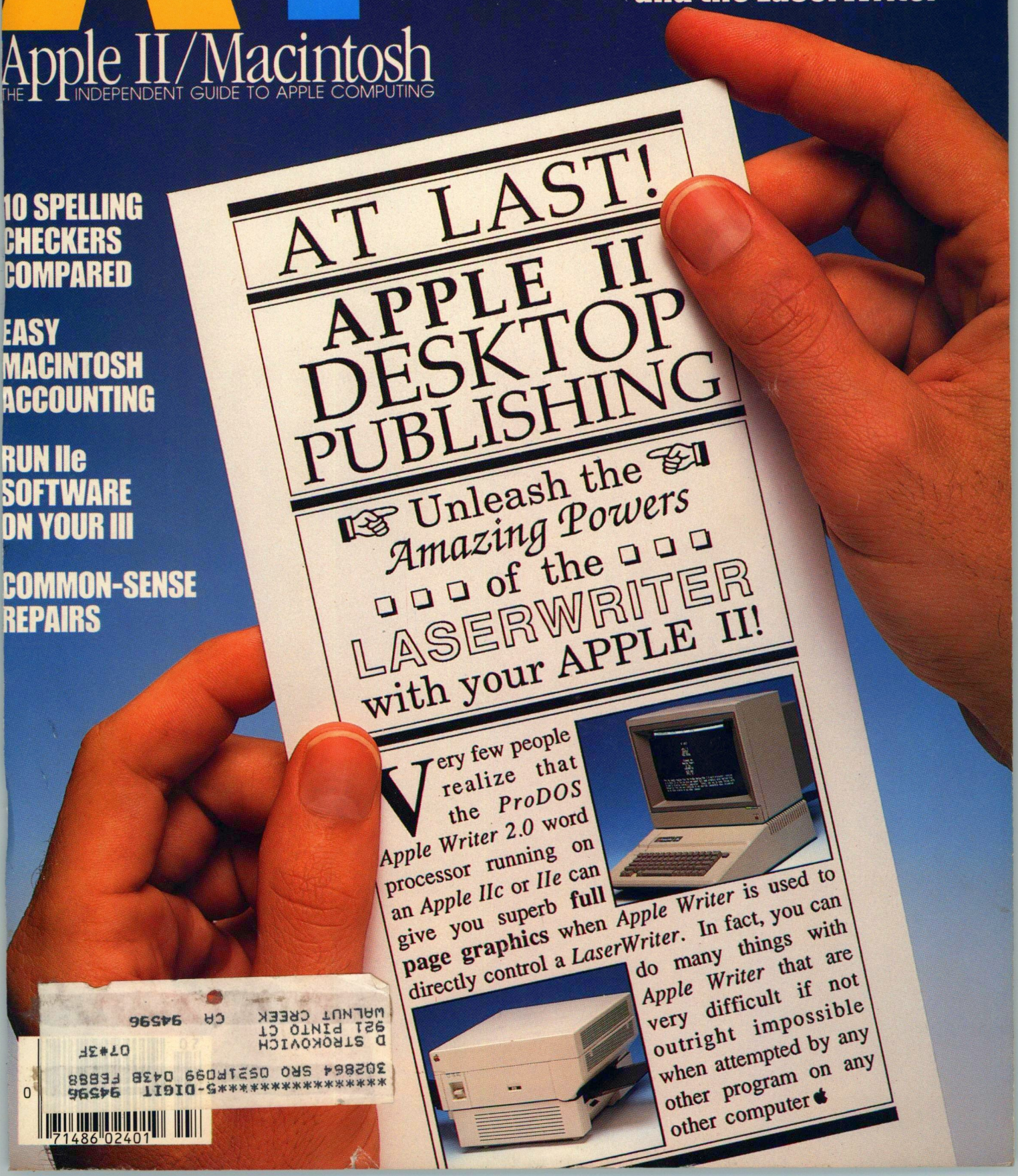
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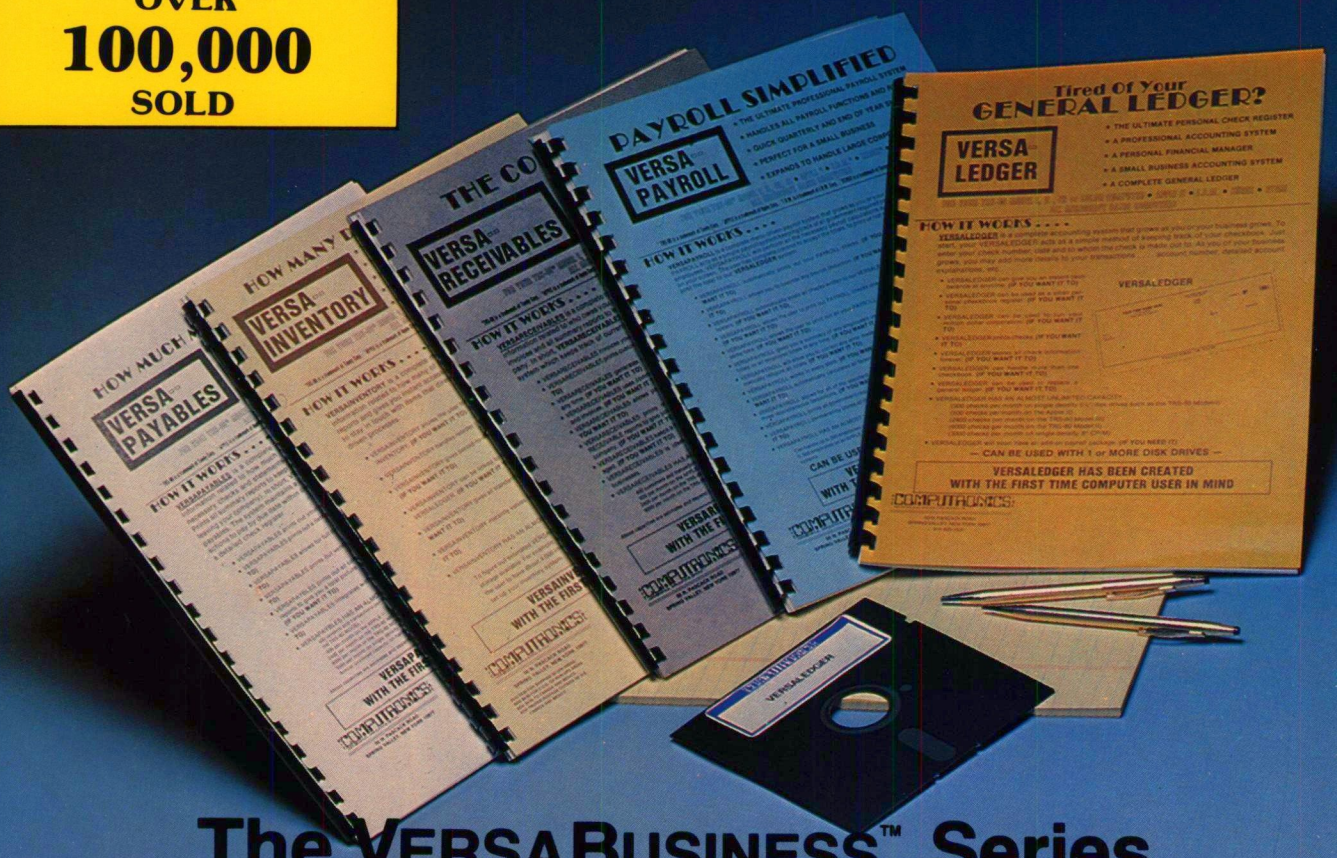

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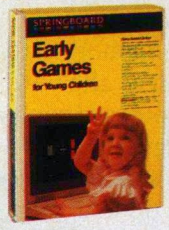

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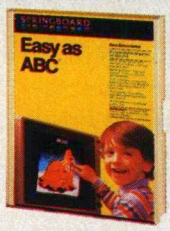

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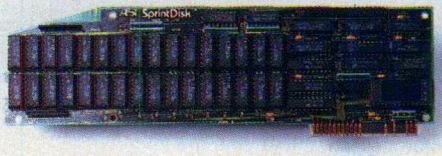

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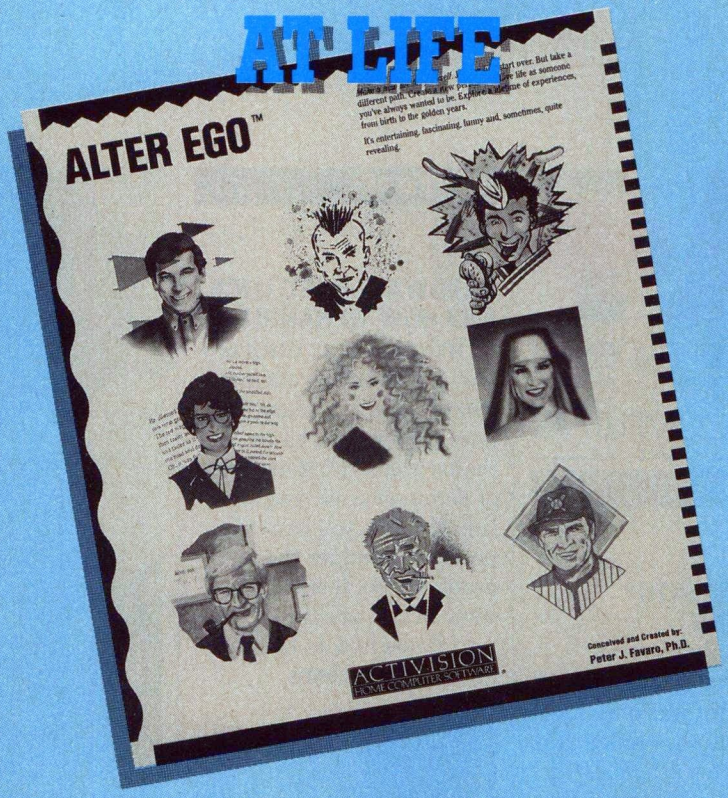

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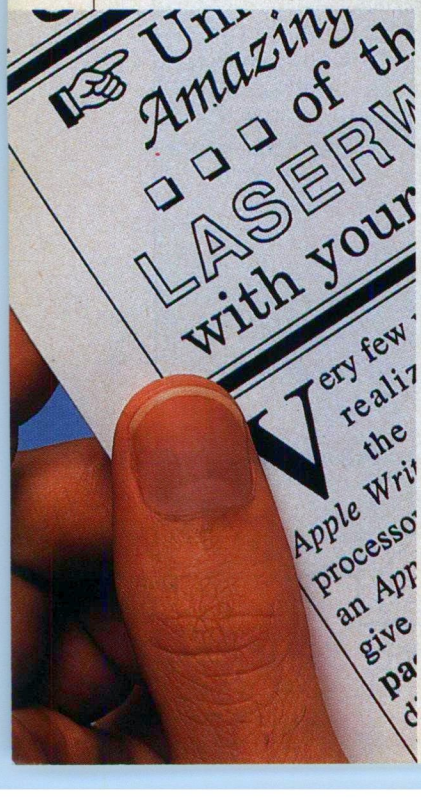

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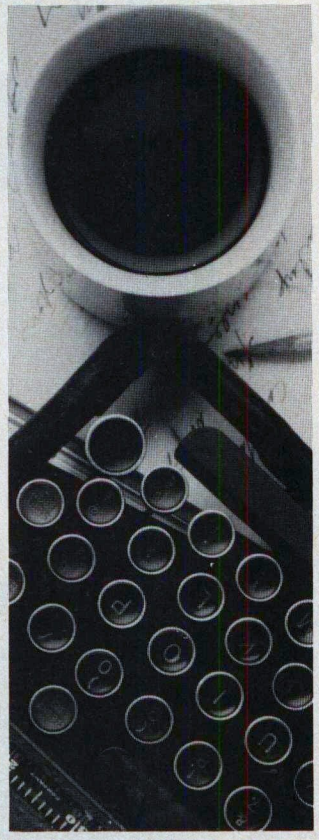

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As many of us already know, no matter how important the information, spelling and typographical errors reflect poorly on the writer. Help is available, though. Software publishers have developed an array of stand-alone and built-in spelling checkers to work in conjunction with word-processing programs. This article and its accompanying chart present many of the spelling checkers you may be considering.

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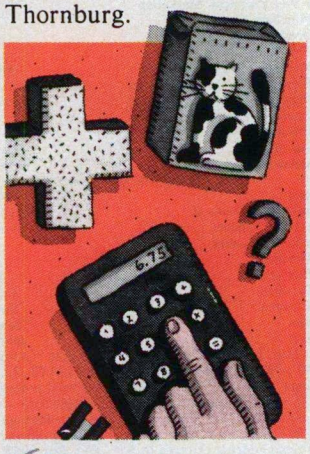

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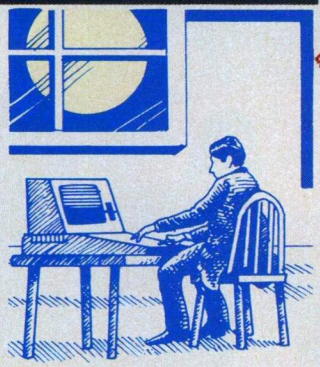

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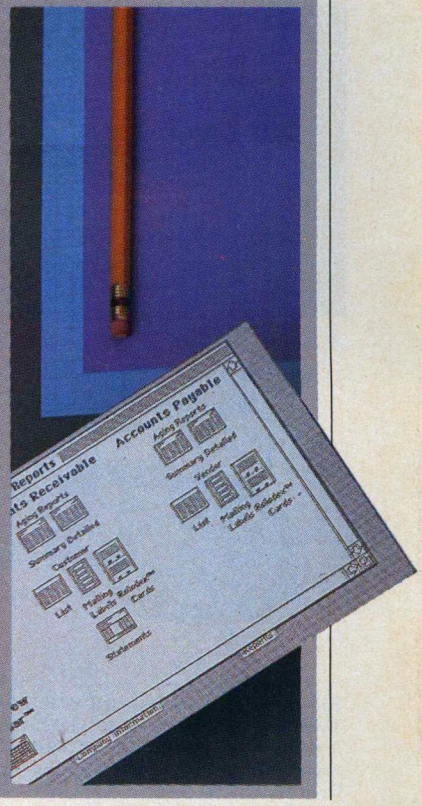

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Message from Maggie

DESKTOP PUBLISHING

Every year a special subject sparks the imagination of the computer industry. This year a major focus is on desktop publishing, which is a significant new way to use microcomputer hardware and software.

Desktop publishing refers to the use of personal computers, page printers, and page-layout software to produce typeset-quality documents at a small fraction of the cost of traditional typesetting.

Until recently, most companies and publishers created typeset documents by employing outside services for typesetting, page layout, and pasteup. Although this process is effective in producing high-quality materials, it is also expensive and time-consuming. The single most important factor in changing the way typeset materials are produced is the advent of laser printing, and the introduction of Apple Computer's LaserWriter in 1985 started the desktop-publishing revolution, even though other laser printers were already available. The LaserWriter was the first low-cost laser printer that contained a powerful built-in computer that used the PostScript page-description language to control the creation of typefaces in a wide variety of styles and fonts. With the power of laser typography accessible to personal computers, suddenly the private domain of typeset-quality publishing opened up to anybody with access to a personal computer, a laser printer, and the appropriate software.

At this point, you may be thinking that there is one large problem with this rosy scenario of publishing becoming the province of personal computers—the Apple II isn't in the picture, because the LaserWriter was built for the Macintosh. Well, we have a pleasant surprise for Apple II owners: The LaserWriter works quite well with the Apple II series; you just have to know how to tap the hidden resources of PostScript contained inside the LaserWriter.

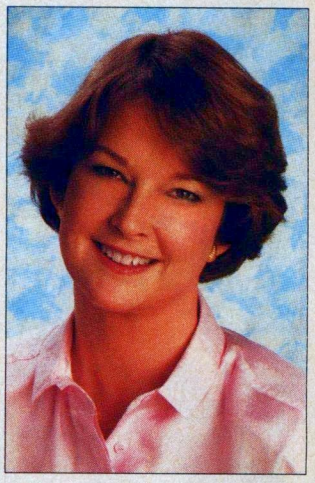
Keeping up with this desktop-publishing revolution is the subject of this month's cover story. We are proud to bring you the details of how to make your Apple II control the LaserWriter to produce professional-looking typeset materials.

To help prove the validity of using an Apple II and the LaserWriter as a desktop-publishing solution, we had our cover illustrator create this month's cover art with an Apple IIe, a LaserWriter, and the Apple Writer II word-processing program. The cover artist, Don Lancaster, is a pioneer in the computer industry, as well as a champion of the Apple II. Lancaster feels the Apple II should definitely not be overlooked by the desktop-publishing market. As a matter of fact, he ardently believes the Apple II can take better advantage of the LaserWriter than the Macintosh can, since the Macintosh does not make full use of PostScript. You can use the Apple II to program the LaserWriter's powerful built-in PostScript controller and achieve special effects that Macintosh applications don't offer. Don's package of LaserWriter utilities for Apple Writer II proves this point, and Steve Rosenthal includes this software in our cover story.

Since so many Apple IIs are in use in small and medium-size businesses, where desktop publishing will flourish, we predict increasing interest in using the Apple II as part of desktop publishing. This month's article is the first of several we will provide to keep you, your Apple II, and your business up to date in this promising area. ✚

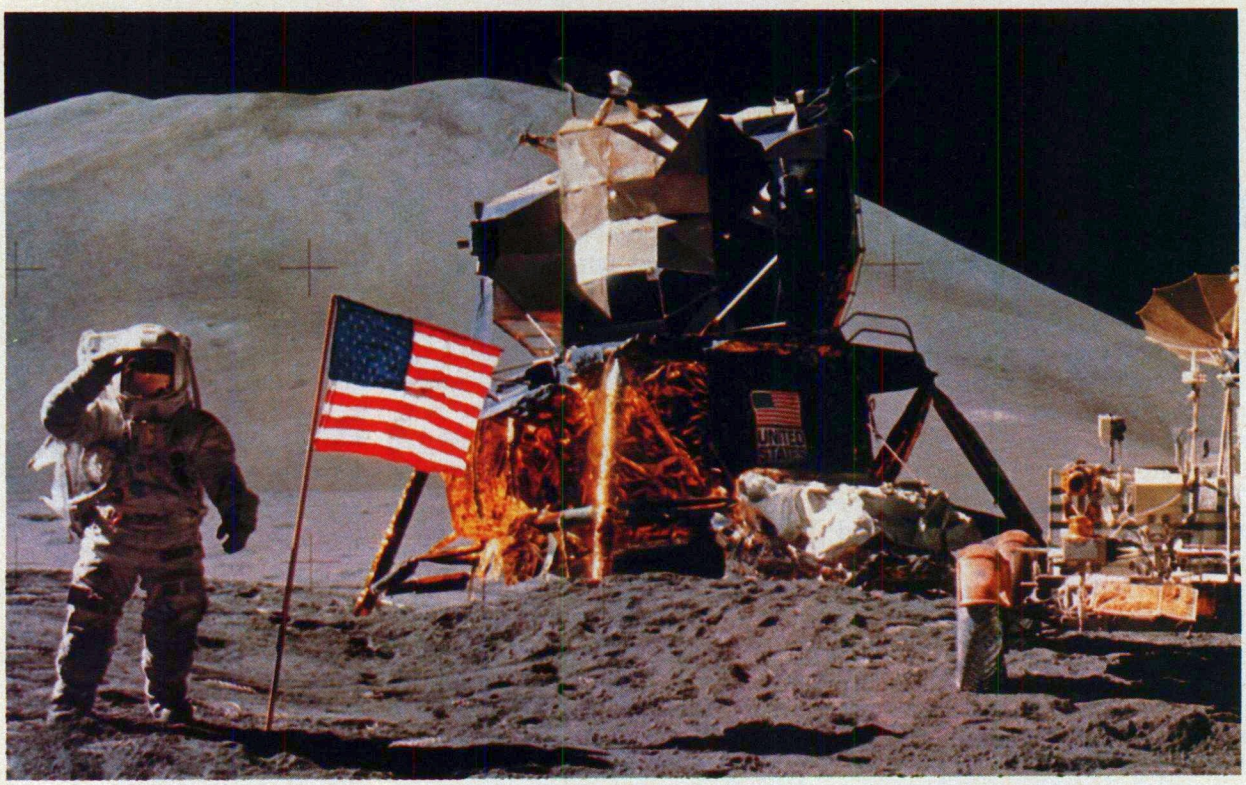
Maggie Canon

MAGGIE CANON/**EDITOR IN CHIEF**



The LaserWriter works quite well with the Apple II series; you just have to know how to tap the hidden resources of PostScript contained inside the LaserWriter.

THE AMERICAN WAY TO THE TOP



This July 4th, we at Applied Engineering hope that all Americans will take time out to ponder who and what we are.

It is hoped that we can remind ourselves what it means to be an American.

We invented the telephone, the electric light, the phonograph, and the airplane. Americans invented the first vacuum tube, transistor and the integrated circuit, without which the personal computer would have been impossible. Over 95% of the world's new inventions are invented by Americans. We lead the world in all phases of technology; electronics, physics, chemistry, health science, space and robotics. We've sent men to the moon, landed a robot on Mars, and sent our probes out across the galaxy! Americans by their very nature are inventors, thinkers, winners and doers.

America is a country where two young men started a company in their garage and three years later Apple Computer is the industry leader. Applied Engineering started much the same way and we became the leading Apple peripheral manufacturer, with no outside sales force, no marketing strategy, and no commissioned sales people.

Our business plan at Applied Engineering is simple. BE THE BEST. That means producing tomorrow's peripherals today, it means hard work, high quality, total dedication to Apple Computer and good service at competitive prices.

While some other guys are losing the ball game . . . we're adding to our roster. In the past few months, we've added 4 new products to our line up for a total of 26 and we're working on more. We've added more order lines and more knowledgeable people to serve you.

While others look to the Orient for solutions to their engineering and manufacturing problems, we at Applied Engineering feel differently because we know America's inventive past and her inventive future and we're excited.

To quote Dr. Robert Goddard in a letter to H. G. Wells, "There can be no thought of finishing, for 'aiming at the stars,' both literally and figuratively, is a problem to occupy generations, so that no matter how much progress one makes, there is always the thrill of just beginning."

APPLIED ENGINEERING
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Letters

We invite your comments.

CUSTOM SOLUTION

Dear A+: A while ago (in the October 1985 issue), I read the comments of letter writer S. Richard Ravich on the lack of support for his Starfire drive, and I heard a familiar ring. I own a Rana Elite II floppy-disk drive and wanted to use its extended capacity under ProDOS, but no support was available. Being fed up with this situation, I decided to modify the ProDOS 1.1.1 diskette driver to recognize my drive's abilities. I purchased a copy of *Beneath Apple ProDOS* by Quality Software, and, after many many hours of work, I now can use ProDOS with my expanded drive as well as with the Elite I or III drives. In this time when computer users are subject to the whims of hardware manufacturers, it's nice to know you can tip the scales with the abundant information available on the Apple II—a luxury many other microcomputer owners do not enjoy. If any are interested in the modifications, use the following address.

L.D. Crandall
P.O. Box 386
Bonita, CA 92002

LOGICAL EXTREMES

Dear A+: To comply with Dr. John Caruso, Jr.'s request ("Letters," May 1986) I suggest that Apple Computer change its Macintosh manual to depict one male and one female each of the following: white, black, Hispanic, American Indian, oriental, and "other." And to complete the 24 pictures, one each of the above but handicapped (or gay). And if there are still complaints by some minorities, they should start deleting text and replacing it with the respective pictures until we have a nice album of all possible ethnic, sexual, and other distinctive characteristics and all possible combinations of them. Never mind the primary object of the manual, which is to convey information about a computer, not to play ridiculous political games.

Roberto Restrepo, M.D.
Fort Worth, TX

BEYOND BASIC

Dear A+: I was so pleased at David Thornburg's "Learning Curve" column on the shortcomings of Applesoft BASIC in your February 1986 issue that I was inclined to write you a letter of thanks. Time passed, and I neglected to do so. However, in view of recent criticisms by letter writers Allan Porter and Allan Mahler (April 1986), I feel I must respond.

Mr. Porter says the column was a disservice to your readers. If he feels that the airing of alternative views is a disservice, I suggest he begin lobbying Congress immediately for the repeal of the first amendment. Thornburg stuck to the facts in his article. Every criticism he cited was well founded.

I do not differ with the letter writer on the fact that "the genesis of any computer program is inside the human skull." Indeed, this is where all the great inventions of mankind begin. Given a creative thought, however, available tools must be used to implement that thought. Throughout history, in all professional fields, old tools have often been discarded for new ones that lead to higher quality and productivity. Worldwide, study after study has shown that the use of structured languages, such as Pascal, lead to more reliable programs and more productive programmers.

As for Mr. Mahler, I'm sorry if his body cannot stand the tremendous physical strain of having to enter TWO WHOLE CHARACTERS for an assignment operator (Pascal's :=). I certainly am glad I do not have to read any of his programs if the number of keystrokes per line is his prime consideration.

The writer is correct about English. It is far from perfect. That is why engineers, mathematicians, musicians, and professionals in countless other fields have all adopted other, more precise, notations for their craft. As the demands of their work increased, the notations they used were often traded for more useful conventions. Why should the profession of computer programming be different?

As for the writer's difficulty in having a Pascal program write to the printer while the program is running, I have had the opportunity to experience both Apple Pascal and Turbo Pascal and have had no such trouble with either.

In Turbo, there is a built-in logical output device (LST) that allows you to do this directly. In Apple Pascal, you need merely to open the printer device (PRINTER:) as an output file. In both cases, this information is readily available in the language manual. One has to wonder how open-minded Mr. Mahler was about Pascal as he allegedly "fought for a few months" with a language frequently taught to college freshmen in a ten-week quarter.

As for criticism of the "experts," they have something that the writer, because of his attitude, will never achieve. They have the experience of working with *many* programming languages. They do not believe Pascal is perfect, any more than they believe BASIC is perfect. Both BASIC and Pascal are merely single steps in the evolution of computer languages. Indeed, Niklaus Wirth, the creator of

Pascal, accepted criticisms of his own language and created a new language (Modula-2) to correct some of its shortcomings. Now *that* is open-minded!

Remember, when it first appeared, BASIC was very "different." Indeed, the *B* in *BASIC* stands for *beginners*. Those who wish to continue using beginners' tools should step aside and allow the rest of us to progress to Pascal and beyond!

Dale E. Courte
Dayton, OH

CD-ROM APPLICATION

Dear *A+*: I recently read your article entitled "Optical Data Storage" in the April 1986 issue of *A+* and found it very interesting. Compact Disc Read-Only Memory (CD-ROM) technology certainly is an innovation in data storage that holds many great possibilities.

The article mentioned that Reference Technology has developed the application of a database covering toxicology and drug interactions. The database you referred to is the Computerized Clinical Information System (CCIS) of Micromedex, Inc. I would like to point out that although Reference Technology assembles the CD-ROMs, the database is actually produced and sold by Micromedex, Inc. of Denver, Colorado.

In 1985, Micromedex, (which had been producing medical databases on microfiche since 1974), became the first company to produce a database using the CD-ROM. The Computerized Clinical Information System of Micromedex includes the Poisindex, Drugdex, Emergindex, and Indentidex databases. The system is currently used by physicians, pharmacists, nurses, and other allied health professionals in hospitals, drug and poison centers, clinics, and physician's offices throughout the world.

Nancy E. Kuchta
Micromedex, Inc.
Denver, CO

FAIRNESS IN UPDATES

Dear *A+*: Recently, on the strength of articles in your magazine, I purchased Mouse Calc from International Solutions. It was version 1.0. After spending the weekend playing around with it, I called the company in California long distance from the Chicago area to ask some questions. Then I found out that a new version 1.2 was out and that I would have to pay for it.

COME ON NOW!! I had owned the program for three days and was being told that I could update it for a service charge. The president, Mr. Mark Kuamme, and I went at it for about ten minutes, and I came away no better than before. He thinks it is fair to ask new users to pay for updates even if they have just bought the program, and I think it stinks! He even welcomes my bitch letters to the press and helped me spell his name correctly. I assume because of all the thousands of dollars they spend in your magazine, you won't have the guts to print bad press about him. Please tell me you have more morals than that. After all, you have the duty to present both sides to your readers and inform them. Your only loyalty should not be to your advertisers.

I believe a $10 update is extremely fair for registered users, but that during the warranty period, especially the first week of ownership, updates should be automatic, free, and fast.

Kenneth Clybor
Wheeling, IL

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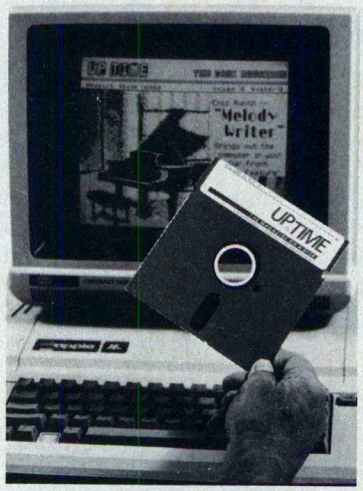

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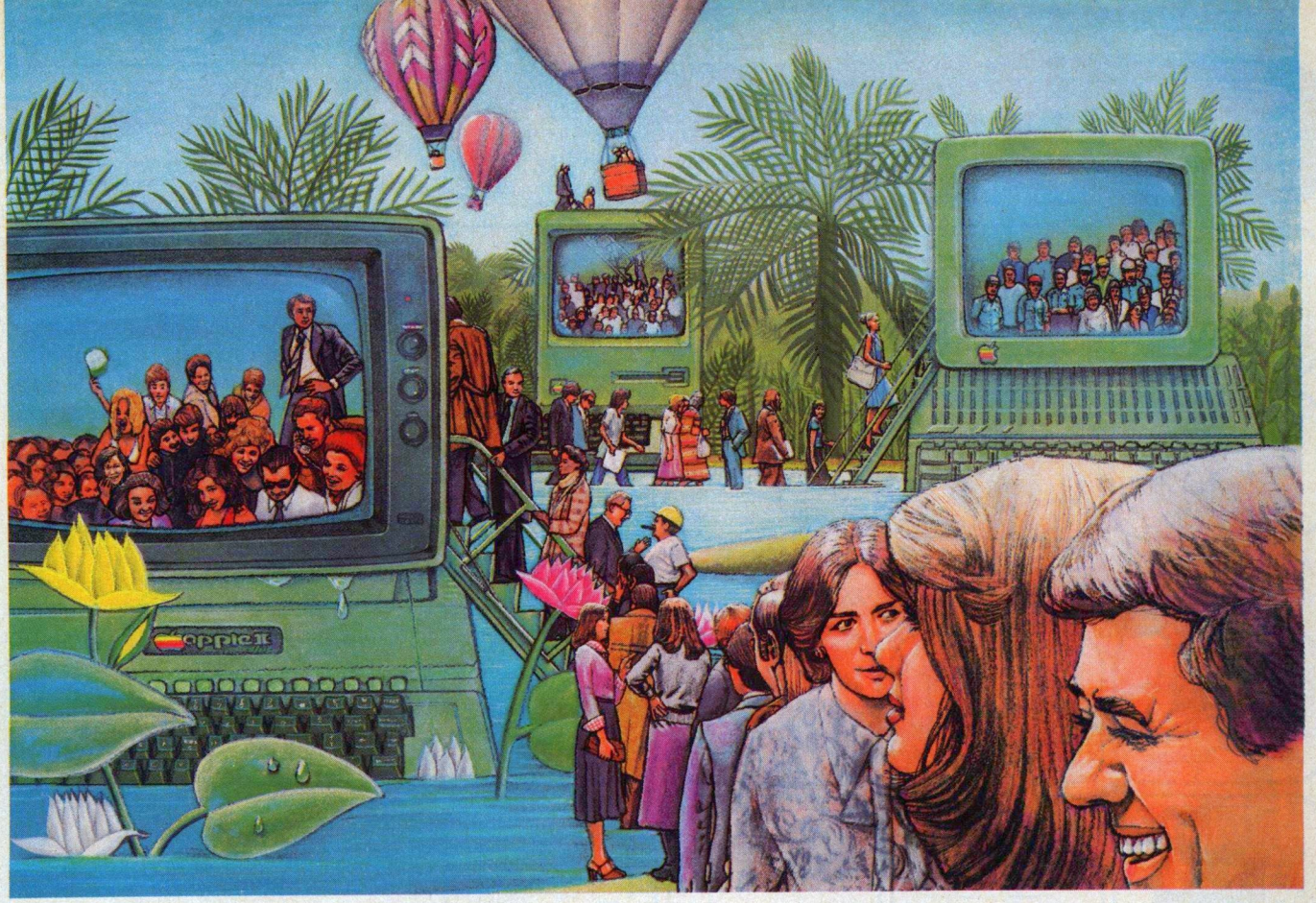

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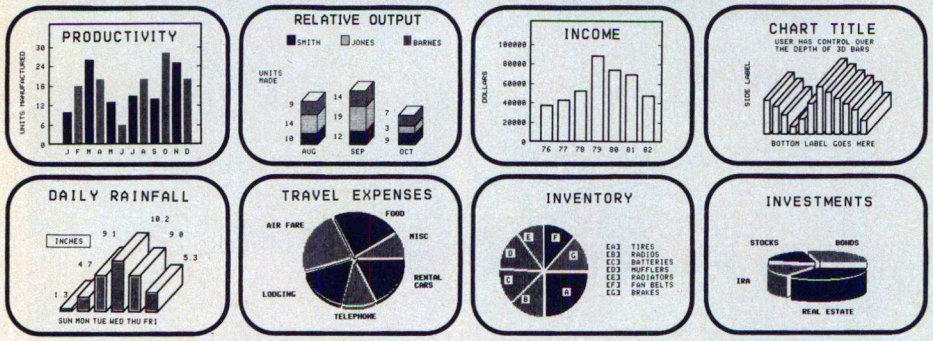

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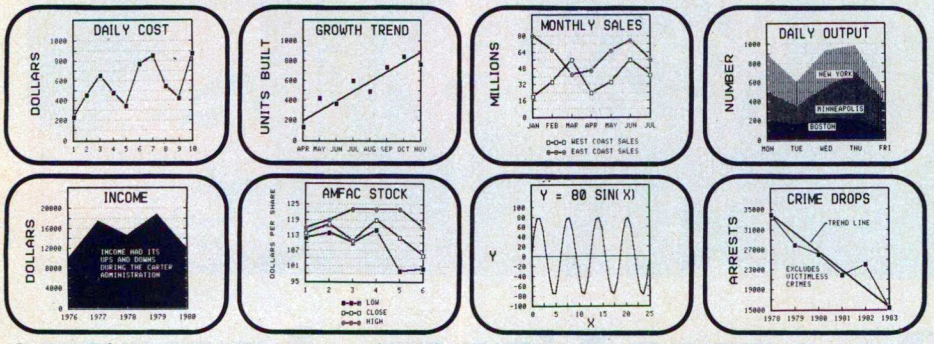

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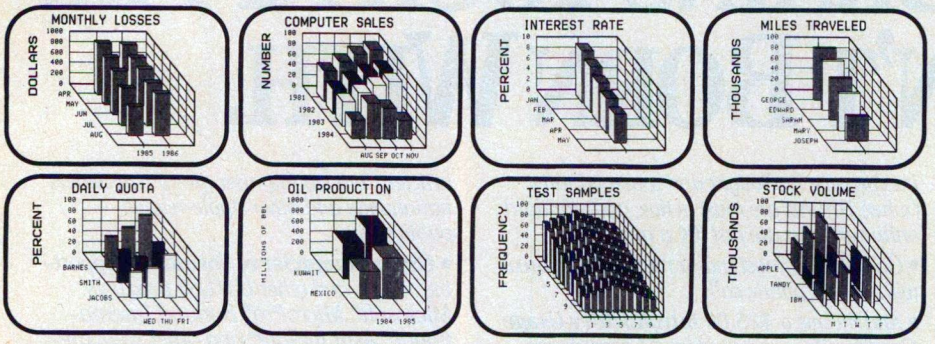

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CORRECTION

In the Apple Cable Connection chart starting on page 58 of our June 1986 issue, all references to cable number 590-0037 should have listed the pin configuration as *Match identical pin numbers*. Apple's cable specifically matches pin numbers 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 19, 20, and 23 so that you can use it for a variety of peripherals, as the chart indicates. For cable number 590-0335, all the first and second numbers in the pin configuration should be reversed. Also, the Apple III contains a Serial Card III, not a Super Card III.

NO ESKIMOS, EITHER

Dear *A+*: This is a letter in response to that written by a "Dr." Caruso in your May 1986 issue. I am wondering if he has anything better to do than to look through books and magazines catagorizing the races and creeds of those depicted. Has it not occurred to Dr. Caruso that Apple felt it too stupid, to say the least, to hire a representative of each minority to hold a mouse in different chapters of the manual, rather than just use one model? It's the type of person that looks at us as white or black or Indian that prevents us from accepting one another. It's "racially sensitive" people like him that cause the problems. I, personally, am not offended that I did not see an amputee or an Eskimo or even a Latvian in the manual.

Robert Voldemar Zemmers (age 16)
Tacoma, WA

COMPUTER COMPETITION

Dear *A+*: We at the Crittenden Middle School love reading your magazine, and we are hoping you can help us out with a competition we are planning. Our computer lab recently ran a contest using a program called Academic Jeopardy. The scores were almost all perfect. This led us to believe we needed some more difficult questions!

We are now compiling a list of questions for a new contest, which I am currently writing and have named Middle School Bowl. We need a variety of questions and answers on all subjects that will reasonably tax a middle schooler's brain. If your readers wanted to contribute to our program, we would greatly appreciate it.

Jessica Wright
Computer Lab, H.C. Crittenden
10 McDonald Street
Armonk, NY 10504

BY FREDERIC E. DAVIS

NewsPlus

Just imagine this high-resolution monitor on a next-generation color Macintosh!

SONY'S NEW INCREDIBLE MONITOR/TV

Sony has developed a near-flat 41-inch-diagonal Trinitron cathode-ray tube (CRT) with a maximum horizontal resolution of 1861 pixels. Each pixel is composed of a phosphor trio of red, blue, and green dots that can combine to make virtually any color.

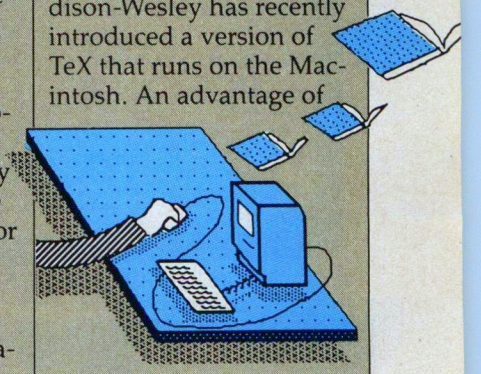
Sony says the tube was developed for use in CAD/CAM applications and eventually for the Japanese Hi-Vision HDTV (High Definition TV) system being proposed as a future television standard to give TV pictures many times the picture quality of today's sets. Don't expect to be able to run right out and buy these, though. Sony recently announced a prototype model of a monitor based on the tube, with a resolution of more than 1000 lines horizontally and more than 750 lines vertically, which is available only to developers for the small sum of about $40,000 each. Sony officials claim the picture quality is good enough for displaying color slides with barely any loss of quality. Just imagine that monitor on a next-generation color Macintosh. Wow!

SONY'S NEW 41-INCH HIGH-DEFINITION VIDEO SYSTEM (HDVS) COLOR MONITOR

DESKTOP PUBLISHING

Desktop publishing, a term coined by Paul Brainerd of Aldus Corporation, is definitely one of the most commonly heard computer buzzwords these days. Many people, including myself, feel that desktop publishing represents a major new use of personal computers. I started exploring the use of personal computers in electronic-publishing systems five years ago, when I used an Apple II to create documents for the computer typesetting of a plant dictionary I was writing, using the TeX typesetting language developed at Stanford University. I inserted the TeX commands into a database template on the Apple and then telecommunicated the files to a DEC System 20 mainframe for processing.

Times have changed. The TeX typesetting language no longer requires a mainframe; in fact, Addison-Wesley has recently introduced a version of TeX that runs on the Macintosh. An advantage of



TeX over page-layout programs such as PageMaker is that TeX works with ordinary text files from almost any program on almost any computer. You can now create word-processing, database, or other files that contain embedded TeX instructions on your Apple II and transfer them to a Macintosh for typesetting and printing on the LaserWriter or a Linotronic typesetting machine—a good example of how the Mac and the II can work together effectively.

The Apple II is an excellent low-cost data-entry workstation that costs less than some terminals yet offers local disk storage and processing. The Mac, with a megabyte of RAM and a 32-bit processor, is as powerful as the mainframes of yesteryear and can handle complex tasks, such as TeX processing,

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NewsPlus

that are beyond the capability of an Apple II.

For more information about desktop publishing, take a look at *Desktop Publishing* from Dow Jones-Irwin, of which I was coauthor. Two *A+* people helped out: *A+*'s senior copy editor, Eva Langfeldt, contributed as a writer and editor, and the book was formatted and indexed by Michael Wiesenberg, author of *A+*'s "Computer Calisthenics" column, using the aforementioned TeX typesetting language.

IBM ADOPTS 3.5-INCH DRIVES

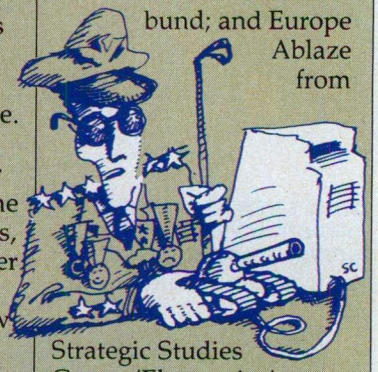
The new IBM PC Convertible laptop computer uses the same 3.5-inch Sony-style double-sided drives and diskettes that the Macintosh Plus and the Apple II UniDisk 3.5 have. The new 3.5-inch drives are also being offered for the other computers in the IBM PC and PC AT series, and IBM and a lot of other developers already offer their software on the new 3.5-inch diskettes.

IBM's endorsement of the Sony-style 3.5-inch diskette is sure to go a long way toward bolstering this type of diskette as a major industry standard. As owners of Macintoshes and Apple IIs with Unidisk 3.5's already know, the 3.5-inch diskettes are much more convenient to work with than the 5¼-inch diskettes that are so prevalent today.

Another interesting potential is the possibility of being able to read information on IBM PC diskettes with an Apple II or Macintosh, and vice versa. This development would create a significant level of data compatibility among various models of IBM and Apple computers.

ARMY TO USE VIDEO GAMES FOR TRAINING

We have been receiving an incredible number of war-related computer games lately, including Colonial Conquest, Battle Group, and Nam from Strategic Simulations; Under Fire from Avalon Hill; Ancient Art of War from Brøderbund; and Europe Ablaze from



Strategic Studies Group/Electronic Arts. And now I've just found out that the U.S. Army has been taken with the war-game/simulation craze. The Army's way to do it was to award a $57.8 million contract to a firm called Perceptronics, Inc., located in Woodland Hills, California, to create a computer-controlled battlefield simulation.

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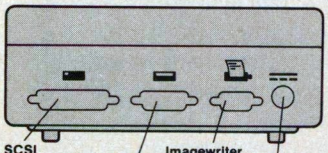

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NewsPlus

Entertainment-software producers are being hurt from all sides.

SOFTWARE-COMPANY BLUES

Software companies that produce entertainment software for the Macintosh are really singing the blues lately. These poor guys are being hurt from all sides. Marc Canter, president of MacroMind, tells me that Hayden Software is so many months behind on paying his company royalties for hit programs such as MusicWorks, VideoWorks, and CheapPaint that he's unable to keep up with his original plans for creating the next batch of great software and often worries how he'll be able to keep funding his current staff of only six people. And Hayden isn't the only firm that hasn't been paying its bills to software developers lately; First Software, one of the largest software distributors, is in serious financial trouble and owes a lot of money to many starving developers.

To make matters worse, Macintosh owners don't seem to be willing to part with many dollars for entertainment software. Illegal copying of programs is rampant among collegiate Mac users and others who are ordinarily a prime market for entertainment titles. When Charlie Jackson of Silicon Beach Software told me how many copies of his company's fine Enchanted Scepters adventure game sold last month, I could have cried. And the folks at Electronic Arts tell me that the Apple II is almost always part of their plans for an entertainment product but porting games over to the Mac is a much lower priority. Has Apple finally convinced the world that the Mac really is a business computer?

CHEAPER MULTILAYER BOARDS

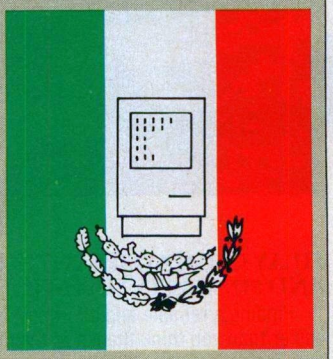
West-Tronics of Bensonville, Illinois, recently announced that it has developed a new method of creating multilayer printed circuit boards that cost about 16 to 20 cents per square inch for a four-layer board, which is only half what traditional boards cost. According to West-Tronics, the new boards are cheaper because the company's process eliminates a lot of the traditional etching and laminating of multilayer-board manufacturing.

SERVANT

Macintosh wizard Andy Hertzfeld is busy working on a new program tentatively called Servant that is an alternative to the Macintosh Finder. We got a sneak preview of this fascinating program when Andy demonstrated it to the Apple 32'ers users' group this spring. Servant is packed with features yet loads twice as fast as the current HFS and up to five times faster than the old MFS. Servant also permits multiple application windows to be open on the desktop simultaneously.

Andy has slightly deviated from Apple's way of doing things, which has prompted some squawks from Apple people; for example, Andy doesn't like scroll bars except for word processing, so he has chosen to use a hand to move the desktop (similar to the hand in MacPaint). Andy says that if Apple is not interested in Servant, he will find a third-party developer to market it for him.

Some of the other features in the preliminary version of Servant are the ability to assign custom-designed icons to folders or to edit other icons; the ability to use any MacPaint document as the background pattern on the desktop; a speech option that speaks the name of any icon or menu choice that you select; movement of the actual outline of the icon when you drag it—not a simple rectangle as in the current Finder; and the ability to view the name, size, and date of files in conjunction with the full-size icons. Some neat cosmetic touches add a little flair: The hands of the watch spin while you are waiting, and the lid of the trash can flips open when you throw something away. We'll keep you posted as we find out more about Servant.



THE MAC GOES TO MEXICO

Apple de Mexico has finally received approval to sell Macs in Mexico and has announced that it is offering Spanish versions of many popular programs, from Excel to PageMaker. Apple has also created a special Apple IIe Turbo System for sale in Latin America. This system is selling well in Mexico, where Apple has an estimated 35% of the personal-computer market.

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CIRCLE 199 ON READER SERVICE CARD

NewsPlus

So just tie my Apple Lisa
To my worn out
Appaloosa . . .

EASTER EGGS

In my March column, I announced an *A+* Easter Egg Hunt. Easter eggs are special messages or features hidden in programs by whimsical programmers. These messages or features appear only if you take unusual actions. Here are the best Easter eggs:

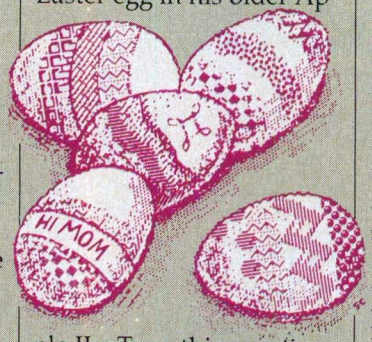
From Dustin Lee Berg: Put the Congo Bongo game disk into your Apple II, turn the computer on, don't do anything until the first full screen comes on, and then press Control-A to see a bunch of otherwise hidden thank-you notes.

From Tyler Bowell of Lynden, Washington; Scott Dau of Annandale, Virginia; and Nicholas Brenckle of Hamden, Connecticut: When you get to the tactical display in the game Skyfox on the Apple II, try pressing Control-G.

Another from Tyler Bowell: To avoid having to worry about your men in Choplifter! and thereby extend your playing time, start the game by landing beside some men, on their right side, but don't let them get into the chopper; when the men get as close as they can to the chopper, take off and land about halfway across the screen. Repeat this process until you get at least one man to the base. Since this man did not board the chopper, the computer doesn't count him as having arrived at the base, which means there are only 63 men left, but the computer thinks there are 64. This quirk will allow you to play until all your choppers are used up, without having to worry about men.

Three more from Scott Dau: Try pressing either Control-^ or Control-| during the game Hard Hat Mack for the Apple II. Pressing Control-B several times while playing Gumball on an Apple II produces interesting results.

Josh Brookhart from Hudson, Ohio, found this Easter egg in his older Apple IIc: Type this one-line program into an Apple IIc with the old ROMs:




```
10 PR#5:IN#5:INPUT A$:PRINT A$
```

Chandid Wilson tells us that if you are not able to complete Friday on the Gumball game for the Apple II, you can see a special message on track 1F, sectors F and E.

According to George Howe of Scotia, New York, another disk location for a secret message is on track 17 (hex 11), sector 5 in The Print Shop for the Apple II.

George Deriso of Fremont, California, says that the "Stolen from Apple Computer" message hidden in the Macintosh ROM has been changed from location $40AD26 in the original Mac to location $40E118 in the Mac Plus.

From C. V. Rao of Houston, Texas: If you play the Airborne game on the Macintosh on Christmas (or with the Mac's calendar set to December 25), a Christmas tree appears in the field instead of a cactus.

Dan Eggleston of Austin, Texas, has a version of the Resource Editor program for the Macintosh that has a few doozies that we've unfortunately been unable to duplicate. If anyone knows which version of the Resource Editor these Easter eggs work with, write to me, and I'll let people know. Anyway, Dan claims that if you hold down the ⌘ and option keys while selecting About Resource Editor from the apple menu, a message appears that states, "Thanks for the Mrs. Field's cookies, etc.," and if you choose About Resource Editor while pressing the Shift, ⌘, and Option keys, your computer will go into "flipping pig mode," whatever that is.

Thanks, everyone, for sharing your Easter eggs!

AN APPLE SONGBOOK?

Writer and computer humorist Dr. John Bear, whom some of you may recognize as the author of the book *Computer Wimp*, read that the original IBM and NCR company songbooks had been rediscovered. Bear, musing on what the Apple Computer songbook might contain, came up with these examples for us:

(to the tune of "Battle Hymn of the Republic")

Mine eyes have seen the
story of our Wozniak
and Jobs
How they rose to fame
and glory, from their
days as nerds and slobs,
As they parlayed their
blue boxes into money
by the gobs,
And Apple rolled along.

Glory be to their endeavor,
Apple II will live forever,
Sculley, Sculley, now or
never,
As Apple rolls along.

(to the tune of "The Last Roundup")

I'm a-headin' for the last
roundup,
To that land where sales
curves rise into the sky,
So just tie my Apple Lisa
To my worn out Appa-
loosa,
And we'll all reach hacker
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CIRCLE 260 ON READER SERVICE CARD

You can use your Apple II-series computer to unleash the powers of the Apple LaserWriter.

APPLE II Desktop Publishing

The Apple LaserWriter is just that—an *Apple* output device, not just a Macintosh printer. Direct support from Apple Computer, Inc. for Apple II/LaserWriter connections is reputed to be on the way, but you can get a head start with some software from outside developers and a little bit of simple programming.

Of course, you can always use a LaserWriter in its daisy-wheel printer simulation mode to print out plain text from just about any Apple II application. The LaserWriter hooks right up to a serial port on the Apple II just the way a serial-interface daisy-wheel printer does, using a standard RS-232 serial cable. You set the software to talk to a Diablo 630 printer and set the Apple LaserWriter for 630 emulation, and away you go.

The LaserWriter can do much more, though. With the PostScript page-description language built in and its own powerful internal computer, the LaserWriter can take commands from the Apple II and process them into complex text and graphics drawn at 300 dots per inch over a full page.

Unfortunately, at present, PostScript is the only language that produces that kind of output on the LaserWriter, and Apple II applications don't yet normally produce PostScript output. Rather than providing PostScript-encoded descriptions of the operations for producing a page image, most Apple II applications produce letters or dot patterns meant for an ImageWriter or similar dot-matrix printer.

Three Possible Solutions

Given that language gap between the II and the LaserWriter, three solutions are possible. You can try to teach the Apple II to produce PostScript, you can intercept Apple II output and translate it to PostScript on the fly, or you can get the LaserWriter to accept ImageWriter files.

Translating is perhaps the easiest general solution, because the techniques are well established for other types of printers. If, for example, you have an Epson printer instead of an ImageWriter, you probably have some translation software (a "driver") that adapts the standard output for the Epson machine. That's also how most Macintosh applications communicate with the LaserWriter, using a driver routine installed as part of the system configuration.

We won't know for sure until Apple releases such a translation product, but the evidence is that the firm has one in the works. At least under ProDOS, it should soon be possible to run an application that was created for the ImageWriter and get results that are as good or better on the laser-based machine.

Especially for the LaserWriter, however, using this type of translation software is not necessarily an optimal solution. The LaserWriter connected through this type of driver wouldn't get any more information than what the software would have provided to the ImageWriter. In effect, the LaserWriter is hobbled by the lesser powers of the ImageWriter, while both the originating program and output device have the potential to do more.

LaserWriter as Computer

Teaching the LaserWriter new tricks at the machine-language and ROM level is also a possibility, but for most of us that approach doesn't seem practical. Although the com-

Here's a laser printer test paragraph that shows you whole word breaks and full wall-to-wall microjustification of **ten fonts all at one time.** Note the automatic justification cancel on the last line of the paragraph. Professional features include an automatic initial capital, a progressive three stage microjustification, and "hanging" punctuation at the line ends. Both *italics* and ***bold italics*** can be freely intermingled. You can include ^{superscripts} gracefully, and print $_{subscripts}$ with equal ease. Nothing very fancy is needed for a 51Ω resistor, or when $\pi = 3.14$. While the mixed fonts may be any shape or size, ranging from 3 point thru 20,000 point, most *Special Effects* are best used very sparingly.

Figure 1: The Apple Writer/LaserWriter Utilities package includes menu choices that let you combine up to ten fonts in the same paragraph.

PHOTOGRAPHY BY CARTER DOW

puter that is embedded in the LaserWriter is a 68000-based machine with ROM, RAM, inputs, and outputs, it's not set up for user programming, and Apple has not made available any programming tools or an operating system.

If you are an experienced programmer, though, you might consider that PostScript, besides being an output language for printers, is also a complete programming language that theoretically can do anything that any other programming language can handle. With the right program, the LaserWriter can accept ImageWriter-format files, smooth out the images for the increased resolution, and print them out in laser-written form. You can also download programs to the LaserWriter and run them, using the Apple II as a terminal.

By far the the easiest way to get the Apple II talking to the LaserWriter right now is to get the Apple II to speak PostScript. Creating PostScript output is somewhat more difficult than simply creating characters and dots, but it's not all that hard.

Desktop publishing with your Apple II-series computer just requires the LaserWriter, some available software, and a little bit of simple programming.

You will, however, have to learn at least some of the PostScript language. You might try the *PostScript Reference Manual* or *PostScript Tutorial and Cookbook*, both from Addison-Wesley; the *A+* PostScript tutorial series (June–September 1985); or any of the growing number of PostScript books.

Once you've figured out what you want to say in PostScript, you shouldn't have much problem with the basic mechanics of getting the Apple II to say it. PostScript page descriptions consist of procedural statements in ASCII (normal text) or bit maps in hexadecimal form, both of which you can produce with the right routines in Applesoft or another programming language.

If you do go this route, remember that PostScript is a vector (drawing procedures)-based, rather than a pixel (dot pattern)-based, language. So creating an image is more like creating shape tables for screen video than it is like fiddling with bits in screen memory. Instead of telling PostScript where each dot should go, you tell it a procedure for drawing an image.

You can, if you wish, send normal Apple II hi-res pictures to the LaserWriter by using some routines in PostScript that accept bit-map pictures in hexadecimal form, but that will give you the Apple II's 192 × 280 screen resolution, rather than the 300-dot-per-inch maximum of the LaserWriter.

Furthermore, when you do get application software to produce PostScript output, you won't be able to see your creations directly on the screen, unless you also write your own PostScript-to-screen pixel converter (which, to say the least, would be a major enterprise). So you'll have to create most of your work as a series of iterations: writing PostScript instructions, printing the result, and then making necessary adjustments.

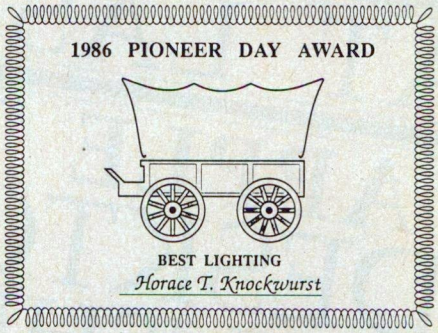

Figure 2: Lancaster's package lets you do curved and fancy text and graphics for logos and awards, and even giant text for signs.

If you have no love for programming, on the other hand, you may just want to wait for a bit. Fairly soon, you should start to see a growing number of programs for the Apple II that include PostScript output meant for the LaserWriter.

Lancaster's Electronic Linecaster

If you do decide to take the PostScript plunge yourself, you don't have to start completely from scratch. Don Lancaster, one of the true pioneers of the personal-computer movement, has been exploring the Apple II/LaserWriter connection, and he's put together an intriguing package called Apple Writer/LaserWriter Utilities that transforms the Apple Writer II word-processing program into a PostScript output package (see "Apple Writer Is an Open Road," below).

The results can be absolutely stunning. Included in the package are routines that set typeset text, routines that draw circuit diagrams, and routines that produce bumper stickers and business cards. One even draws Mickey Mouse.

Happy Hacking

At the stage that I saw them, Lancaster's routines did most of the middle half of the job—you still have to organize the basics, and Lancaster's software won't take care of the very fancy cases. It is, at least right now, intended for those of us who like to hack around: You do need to learn at least some PostScript, and many

APPLE WRITER IS AN *Open Road*

Apple Writer II may not have been designed to drive PostScript printers, but it was designed for change—in the best of the Apple II tradition it includes an open-ended "macro" feature, its own high-level programming language, and even a built-in communications feature.

The macros and the WPL language make it easy to add text strings, find selected points, and pull up various blocks of text, depending on what came before. Basically, you can have WPL perform any operation that you can do directly from the keyboard.

PostScript, felicitously, can be expressed purely in ASCII (ordinary text). So if you add in the right strings at the right places, Apple Writer can indeed speak PostScript.

The adaptation is not completely perfect, however. Because the Apple Writer WPL facility was meant for small and moderate tasks, it is hard to automate the generation of the more-complex PostScript statements.

Furthermore, the PostScript codes are not processed by the II, only by the LaserWriter. As a result, Apple Writer can't tell you if you've made a mistake or asked for operations the LaserWriter can't carry out.

Talking Direct

On the other hand, Apple Writer can at least talk directly to the LaserWriter, so you don't have to switch back and forth to a communications program to try out your files. One of the choices on the Additional Functions menu is Connect Keyboard to Printer/Modem, which routes what normally would go out to the screen to the serial port.

For short PostScript routines, you can hook the LaserWriter up to just about any serial card, run the card's initialization program to set up a 1200- or 9600-bps link (the LaserWriter can work with either speed, but you want the faster 9600 bps), and then switch to Apple Writer.

For longer routines, though, you'll need some kind of "handshaking" that lets the LaserWriter tell the II to pause while already sent characters are processed. The LaserWriter uses the method known variously as DC1/DC3, X-ON/X-OFF, or Ctl-S/Ctl-Q, which means it sends back the first in each character pair when it needs the Apple II to wait and the second character when it's ready for more text. Some cards, including Apple's Super Serial Interface, have such a handshaking feature built into their driver software.

At 9600 bps, Apple Writer can't really keep up a two-way conversation, so if you simply send your PostScript files to the LaserWriter without any special settings, you'll probably miss any error messages that come back during processing. You can get a free copy of how to make those settings from Don Lancaster.

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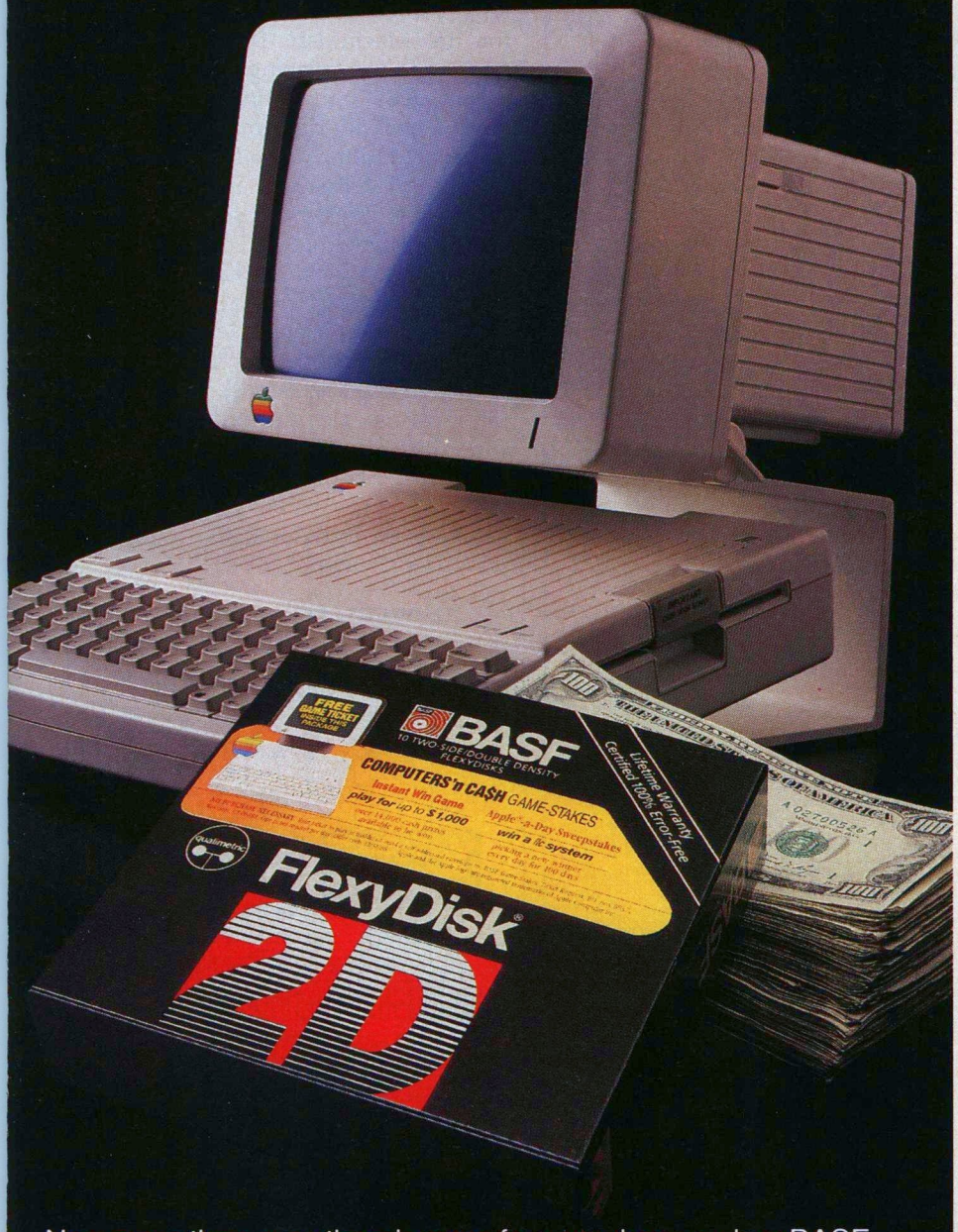

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steps require you to figure out how to customize one of the dozens of examples to perform your specific task.

But the routines are steadily evolving; you get readable, modifiable PostScript source code; the $49.95 price is a true bargain; and Lancaster's update policy is generous: Once you buy a copy, he sends you the next update automatically and keeps doing so as long as you send back the previous update fee. He'll also answer any reasonable question about PostScript and the Apple II by phone at no charge!

Note that to try the package, you'll also need a copy of Apple Writer II ($195, from Apple), an Apple Super Serial card or equivalent, and an RS-232 cable to hook your II up to the LaserWriter.

The Apple Writer Solution

Running the package goes like this: Using the ProDOS filer programs (from your ProDOS user disk), you make a copy of the four disks from Don Lancaster and then move a copy of your Apple Writer program to the first working disk. You boot up this combined program disk and give Apple Writer its initial opening Return.

You're now, courtesy of the Apple Writer Word Processing Language (WPL) and some programming by Lancaster, in a menu-driven system that lets you pick among a dozen or so routines on each disk, switch to any of the three other disks, or exit to Apple Writer.

Most of the routines include demonstration files that you can run by just answering a few yes/no questions, but for any serious work, you'll have to create your own text files either to combine directly with the provided routines or to send to the LaserWriter following a setup routine from the collection.

For example, the Justify menu choice leads you to a submenu with 11 different types of justification (see figure 1). One choice, the Mixed Font justify, lets you combine up to ten different fonts in the same paragraph, including a large multiline initial letter (what typographers call a drop cap). To use this routine, you enter your text as a normal Apple Writer file, with the addition of one or more of the ten possible escape codes (the ESC key followed by a number) wherever you want to change type specifications. Then, you reinvoke Lancaster's routines with the DO

command (Control-P from Apple Writer), start the justify routine, and see what the result looks like on the LaserWriter.

This routine, because it produces PostScript output directly from text rather than from an ImageWriter file, creates much finer typography than what you get from standard programs for the Macintosh. For example, it provides for placing punctuation marks at the end of lines slightly indented into the right margin ("hanging punctuation"), a feature that most simpler programs and most commercial typesetting systems do not normally give you.

Other routines produce multicolumn output, left and right justification, and even centered letters within multiple columns (which makes for attractive lists and tables). You can do step-and-repeat printing for labels, curved and fancy text for logos and awards (see figure 2), and even giant text for signs (which you paste together from individual 8½ × 11 LaserWriter sheets).

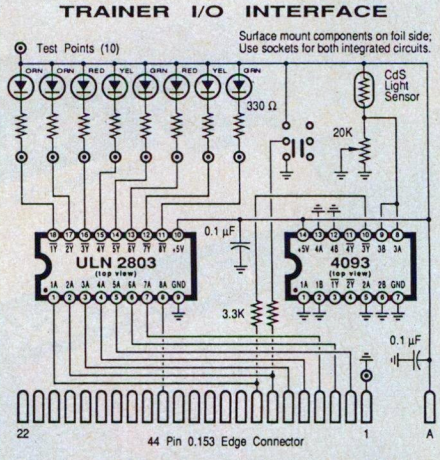

Figure 3: With a little work, you can produce drawings as complex as circuit diagrams.

If you're picture- rather than text-oriented, you'll also find many routines for both serious diagrams and some lighter work. Of necessity, these require a greater knowledge of PostScript and usually a larger number of iterations before you get them just right, but they do let you produce drawings as complex as circuit diagrams or 3-D perspective drawings, even if you can't draw a straight line (see figures 3 and 4).

For most of the graphics routines, you follow a multistep process. First, using the supplied grid routines, you print out a sheet with the markings you need to tell PostScript where to put your images. Then, using that

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grid as a digitizing pad, you enter any necessary coordinates into your file. Typically, simple drawings need 20 coordinate pairs and some of the complex ones several times that. Hand-digitizing and typing in the results may seem like a rather primitive approach, but it's cheap and effective and doesn't take nearly as long as you might fear.

All curved lines in PostScript are made from a set of mathematically generated shapes called curved splines, so you'll probably need to study up on those in the PostScript manuals if you want to do any drawings that are more ambitious than

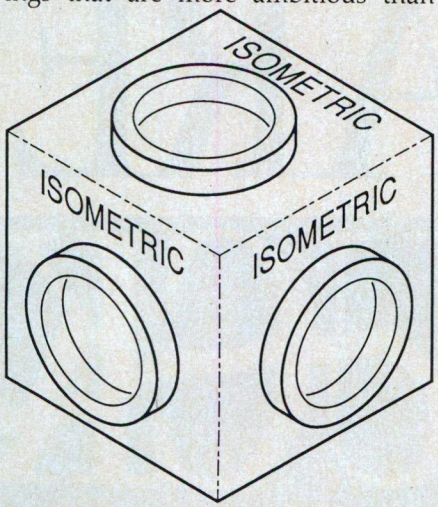

Figure 4: With the right routines, you can produce 3-D perspective drawings even if you can't draw a straight line.

straight-line diagrams. One of the routines in Lancaster's package even prints out small samples of all the shapes possible, in a small grid, to give you an idea of your choices.

Just a First Step

If you have an active imagination, you'll want to create a lot of images that you won't find in these routines. Because you get the PostScript and WPL source code, however, and because your own inputs are text as well, everything you create becomes a building block that you can use again in more complex procedures. You can save, modify, and combine your work, just as with any other Apple Writer text.

If you need to get some regular tasks done efficiently, you can simply use the same routines over and over with new text files to supply the content. Once you get the hang of WPL and PostScript, it's even relatively easy to set up your routines so less computer-knowledgeable people can use them. If you like computer games, you may find just experimenting with PostScript a fascinating exercise. Think of it, perhaps, as a high-end Printed Page Construction Set.

That support for both serious business and some less-serious playfulness is what we've come to expect from Apple—and that's certainly what you'll get if you hook an Apple II and a LaserWriter together. ✚

Steve Rosenthal regularly posts his scripts to A+ magazine, in between his tasks as producer of the television program "The Computer Show."

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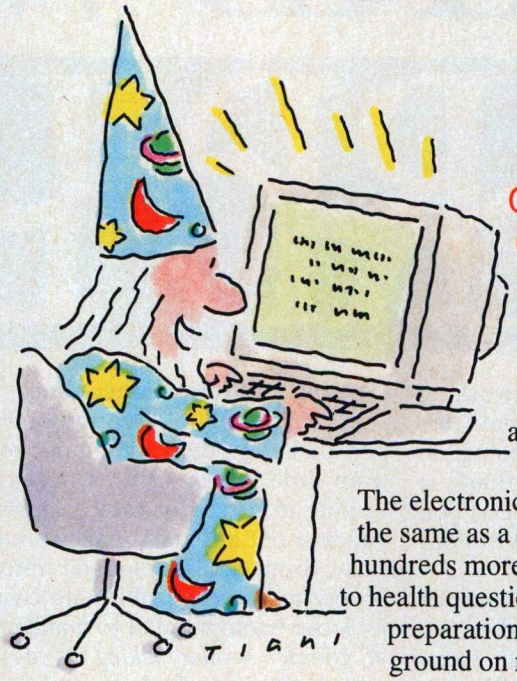

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Nontechnical, common-sense remedies for equipment malfunctions

HARDWARE HARD LUCK

As cooperative and hardworking as your computer may be, sooner or later it's going to throw a tantrum, perhaps a small one, but big enough to cast you back (temporarily, of course) to your old technophobic days.

When your Apple comes a cropper, you can panic and mill around or you can remind yourself that a fair number of problems are soluble with a bit of common sense, a simple tool or two, and a willingness to make the effort. Sure, some computer failures demand special tools and training to overcome them, but if your computer goes strange without filling the air with odious smells, there's a good chance that a little tinkering on your part will put things to right.

Trouble can develop in the (1) cabling and interconnections, (2) computer proper (the box with the chips and boards), (3) keyboard, (4) video monitor, (5) storage system (disk drives), and (6) peripherals (e.g., printer, plotter, modem, digitizer). In the paragraphs that follow, we'll look at some of the easy-to-cope-with difficulties that might arise.

Cabling and Interconnections

A surprisingly large number of personal-computer symptoms result from little things such as neglecting to plug in a cord or cable. So before you tear out any hair, make sure that each connector is plugged into its proper receptacle. Cables are easy to jar loose enough to fail to make proper contact while *looking* as if they were solidly attached.

Cables that you plug in and unplug frequently are susceptible to the sloppies. In time, the pins and shells get worn and loose and refuse to make a solid connection. At some point in time, you'll have to replace one or more of these plug-worn cables, although a little first aid and some care in the process of plugging and unplugging can forestall the inevitable.

The connector that's the easiest to loosen (and, hence, tighten) is the RCA phono plug on computer-to-TV video cables. The outer shell of the plug—made of a thin metal stamping—spreads because you have to wiggle it when inserting it into or removing it from its connection. Use your fingers or a pair of pliers to *gently* press this shell back into shape (see figure 1).

The best way to manage the more elaborate connectors (commonly, DB-25s) is to attach them securely with screws or tape and leave them alone (see figure 2).

If you've determined that you do have a problem, check to see that the pins (male connector) are straight and even and that the shell makes a snug fit over the matching connector (see figure 3).

Suppose you turn on your computer one day, and the monitor comes up with nothing but a raster (a flickering white screen). You can bet that the monitor isn't getting a signal from the computer. Although there are several possible causes, the most common one is a loose or detached video cable. Check the cable at the computer end and the monitor end. If the cable just won't connect firmly, apply first aid, as discussed above. If, on the other hand, you get a completely dark screen, satisfy yourself that the monitor power cord is plugged in and the

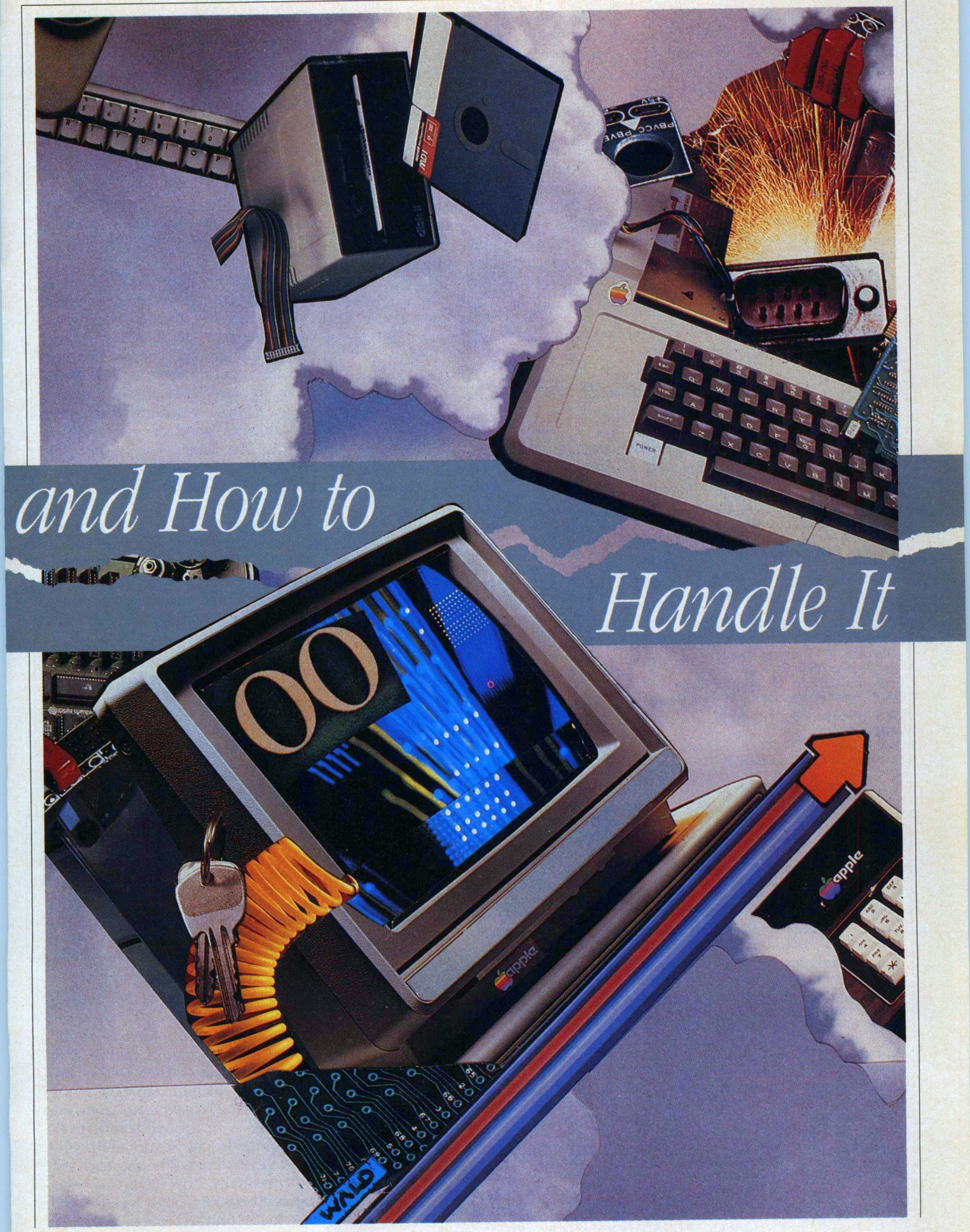

ILLUSTRATION BY CAROL WALD

power switch is turned on.

A good strategy is to plug all your power cords into a single outlet strip, which you can use as the master switch for the whole system (see figure 4).

Invest in a good-quality strip, one with a circuit breaker, a power light, and protection against electrical "noise," which can cause your computer all kinds of aggravation. Expect to spend somewhere around $50. It's well worth it. For ultimate protection (at ultimate cost!), plug your outlet strip into an uninterruptable power supply. Such a doodad not only "conditions" the household electricity, but it also lets you shut down the system gracefully in the event of a brownout or blackout.

The Computer

Troubleshooting the computer itself requires more expertise than I can impart in this short article. Nevertheless, should your Apple II, II Plus, or IIe start exhibiting odd symptoms (deranged displays, refusal to accept input, and other forms of computer dementia), turn the machine off, open the lid, disconnect the internal cables, remove the boards, and blow out (with canned compressed air) and/or vacuum up the dust balls. Then replace everything and try again. Simply reseating connectors reestablishes good contact and can clear up the flakies. For present purposes, the insides of other Apples (including Macs) are off-limits.

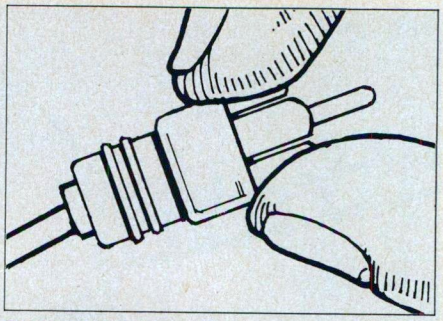

Figure 1: Using your fingers, you can press the shell of an RCA phono plug back into shape.

The Keyboard

If you haven't been conscientious about keeping the keyboard clean, keys can stick or even refuse to produce characters. A thorough application of canned air, followed by a thorough vacuuming, may be the only necessary treatment.

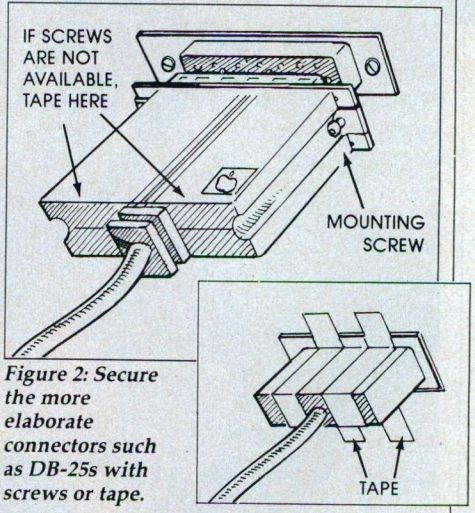

Figure 2: Secure the more elaborate connectors such as DB-25s with screws or tape.

If some keys persist in their recalcitrance, you can try removing the cap from each offending key and spraying the inner workings lightly with electrical contact cleaner, sold at Radio Shack and similar stores. Pop the cap by prying it *gently* up from the front edge with a small screwdriver. Then spritz the cleaner down into the naked key and press the cap back on.

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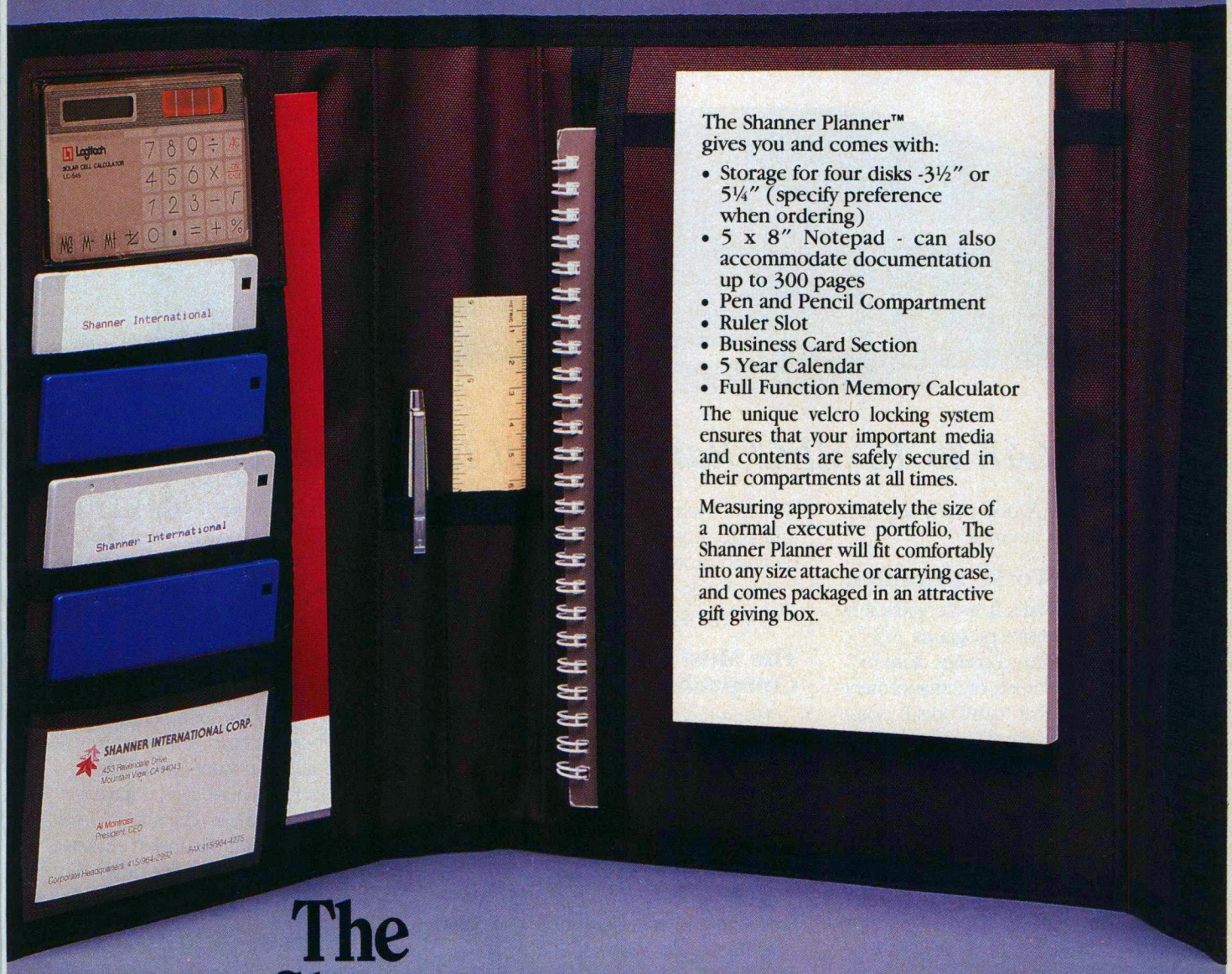

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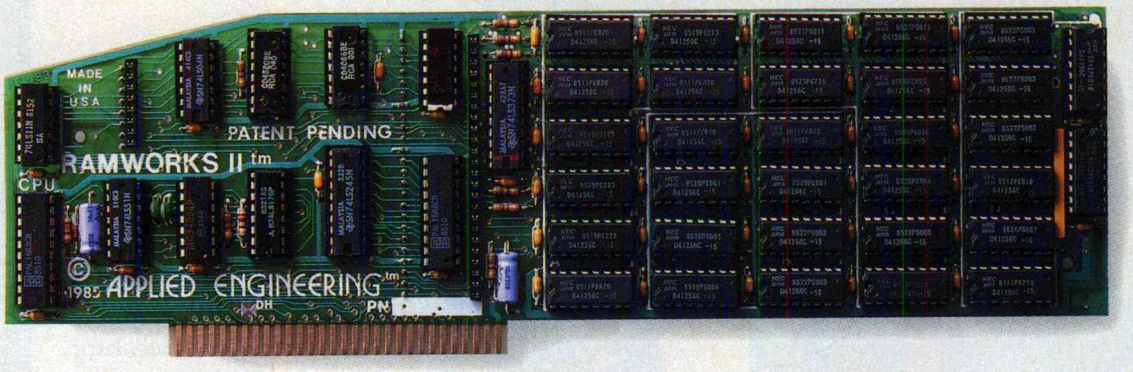

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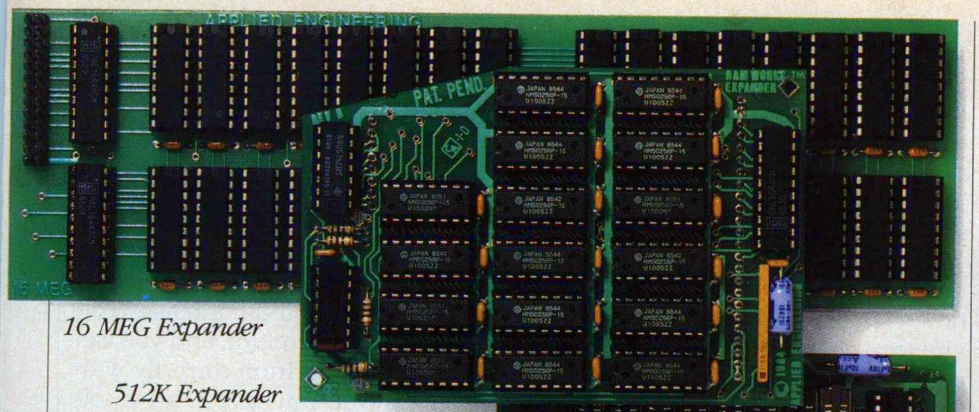

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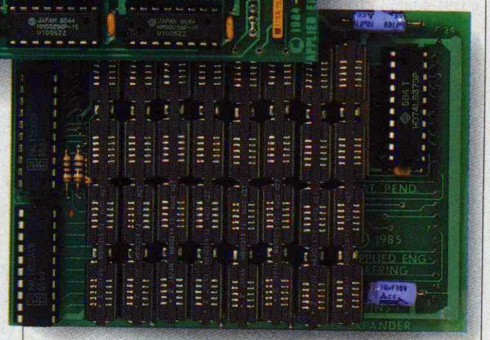

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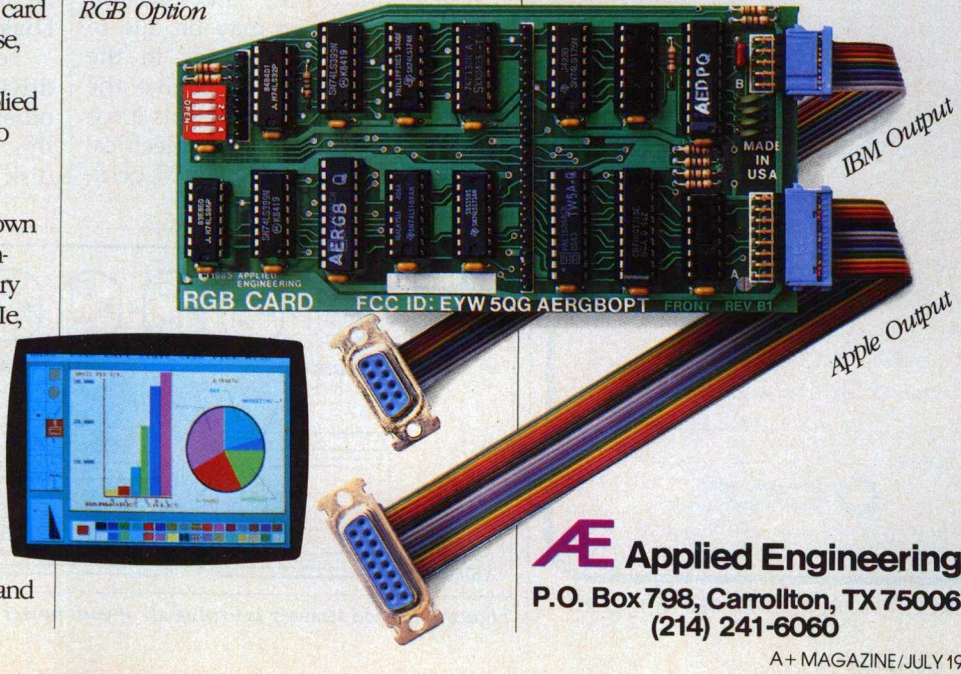

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The Display Monitor

Most monochrome monitors have readily accessible controls for brightness (or "black level") and contrast, as well as horizontal and vertical hold. Some also allow you to adjust picture height and width. Next time you turn on your computer, experiment with these controls and note how each one affects the display. Service personnel report that an unexpectedly large number of home computerists bring in computers that are "malfunctioning," only to find out that someone has inadvertently twitched one or more of the display controls enough to distort or even wipe out the picture.

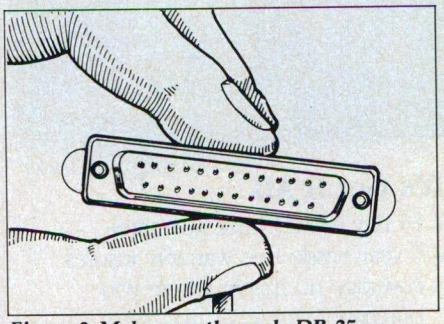

Figure 3: Make sure the male DB-25 connector's pins are straight and even.

The ideal brightness and contrast settings are those that give you a sharp display from your normal viewing distance. Cranking up the brightness smears the image, shortens the life of the picture tube, and gives you a headache. Ditto for contrast. Play with the two controls until you arrive at the sharpest, clearest image at the lowest comfortable viewing intensity.

Horizontal tearing and vertical rolling of the image may be due to various electronic problems in the computer or monitor, but give the horizontal and vertical controls a try. As components age, their electrical values change somewhat, and occasionally you need to compensate by fine-tuning things. You can almost always settle the screen down with some judicious knob twisting.

To the preceding problems, color monitors add those problems that are associated with color saturation (intensity), color accuracy (tint), and color purity and alignment. You can intensify color with the color control, and you can distribute the spectrum correctly with the tint control. You have to leave color alignment (including purity adjustment) to a trained technician, however, who has to open the monitor and do a lot of fiddling around inside—a fairly expensive process.

Unless you've had your monitor or color TV set for a long time, it's unlikely to need alignment. Generally, tinkering with the various image controls (brightness, contrast, color, and tint) should do the job. If you've made a reasonable effort and the display still looks dismal, the TV- or computer-service center is in for some profit at your expense.

Remember that, dollar for dollar, a monochrome monitor gives you a sharper image than a color monitor does. A color TV set used as a monitor gives you the poorest image of all. No matter how much you touch up the controls, you can't overcome the TV's inherent limitations.

Monitors, along with the rest of your equipment, like to be clean. So every few days, wipe the screen off with a *slightly* damp sponge and quickly dry it, and don't allow dust (or anything else) to clog the ventilation slots. Heat and electronic components are natural enemies.

Disk Drives

Service people report that disk drives fail more frequently than any other computer component. Despite this seemingly horrifying statistic, disk drives are pretty reliable. Here

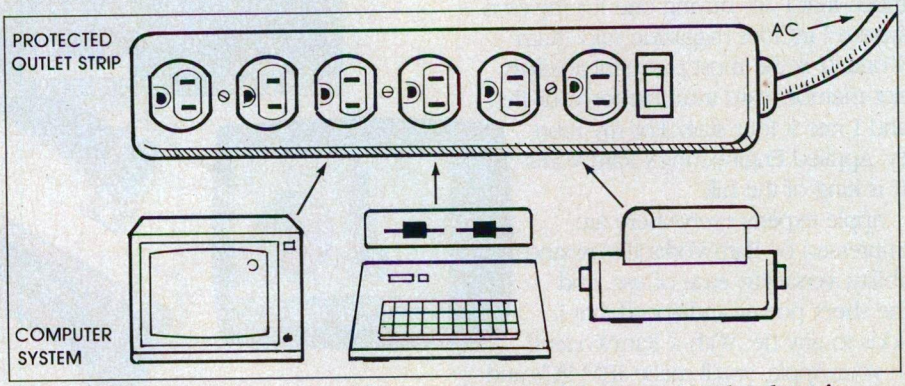

Figure 4: A good strategy is to plug all of your power cords into a protected outlet strip.

are a few hints anyway.

If you have trouble getting a disk to boot, the problem may be with (1) the disk itself (try another copy of the same program or another program); (2) an errant data bit in the system (turn off the computer for a few seconds, remount the disk, close the drive door tightly, and reboot); (3) dirty read/write head(s); or (4) incorrect spin rate. Actually, there can be many other causes, but these are the most common.

You can clean the heads with a commercial head-cleaning kit. Just don't overdo it, or you'll cause premature head wear. To determine if timing really is the cause of your grief, you'll need a diagnostic disk. Retiming requires that you get to the innards of the drive, and the manual that comes with the diagnostic disk should tell you how to do this.

Handle disks carefully, replacing them in their envelopes as soon as you're finished with them, and never leave disks sitting in disk drives when you've closed up shop.

For an in-depth look at do-it-yourself disk-drive repair, dig out your March and April 1985 issues of *A+*, which include a two-part series called "First Aid for Disk Drives."

The Printer

Paper jams, paper dust, and blown dot-matrix printheads constitute the major ills your printer is heir to. Printers with easily accessible configuration switches are also prone to sudden failures due to little fingers' fiddling with little switches. Before doing anything else, check to see that all the switches are properly set. You should have made records of the settings when the printer was installed.

Paper jams usually result from improperly seating the tractor holes on the tractor pins, oblique feeding of continuous forms with a friction-feed printer, or anything that hinders the movement of paper. Hindrances may arise from improper paper loading, small scraps of paper in the paper path, allowing already printed pages to feed back through with new paper (it happens!), and objects sitting on the paper on its way to the printer.

Paper produces a large quantity of fibrous dust that can eventually cause your printer to misbehave. Preventive maintenance pays. Carefully clean out your printer about once a month. Use canned compressed air to dislodge the fibers and a vacuum

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The moral of the story: Maintenance is better than repair. Keep your computer equipment clean, dry, and well connected. Don't let familiarity breed contempt.

cleaner to get rid of them. After the unit is clean, wipe a *thin* coat of high-quality lubricant (such as a Teflon-based oil) onto the rail that carries the printhead.

A blown dot-matrix printhead either refuses to print anything or prints only some of the dots. The result of one or more missing dots is fine blank lines across the printed page. All the popular dot-matrix printers come with user-replaceable printheads, and you'll save a service charge by doing the simple replacement yourself. Order the correct head from the dealer, remove the old head, and mount the new one. Removal generally amounts to no more than taking out two screws and unplugging a small cable. Replacement reverses the process and is just as easy. While you're at it, clean off the printhead rail and wipe on a little bit of lubricant.

The Moral of the Story

Maintenance is better than repair. Keep your equipment clean, dry, and well connected. Don't let familiarity breed contempt. And when disaster strikes, don't panic. Yell, but don't panic. Then sit down and let your sense of logic and order tell you where the problem lies. If you feel you can handle it yourself, give it a try. Otherwise, pack the computer off to the service center. Of course, you must *never* do *anything* to your computer while it's still under warranty! Let Apple Computer worry about it in that case. +

Henry Beechhold is a professor of English and linguistics at Trenton State College in Trenton, New Jersey. He is the author of Plain English Repair and Maintenance for Home Computers *(Simon & Schuster) and is product review editor of* Computer Consultant.

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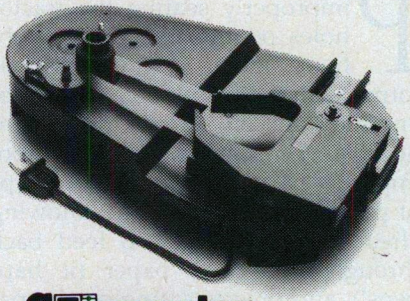

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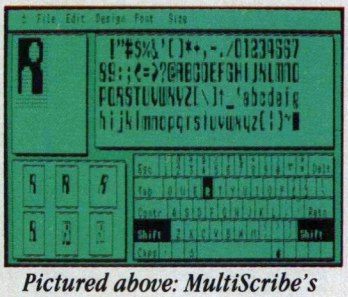
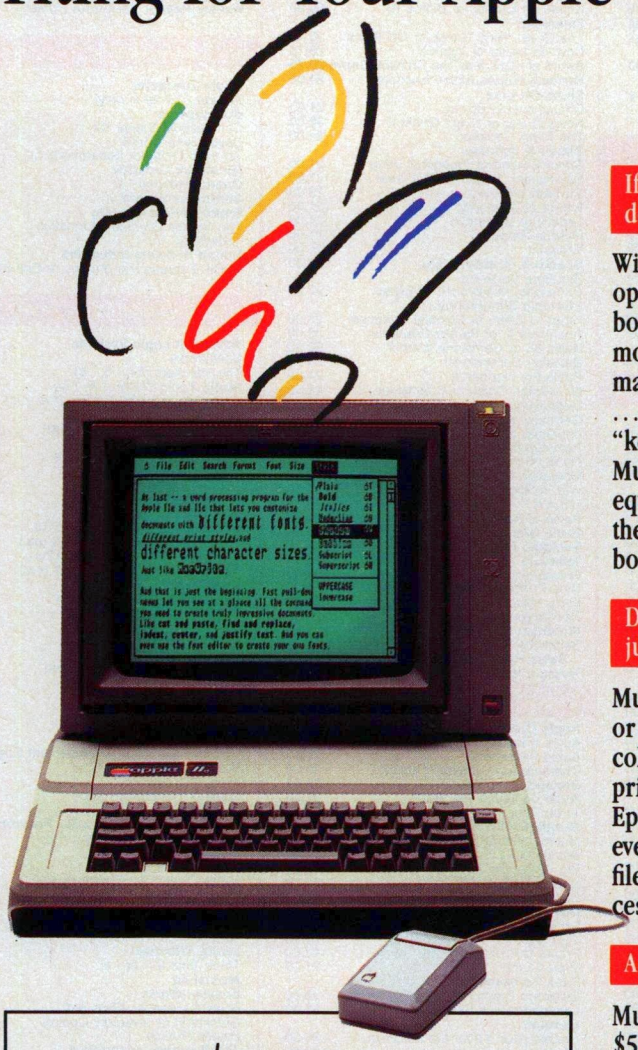


Pictured above: MultiScribe's font editor.



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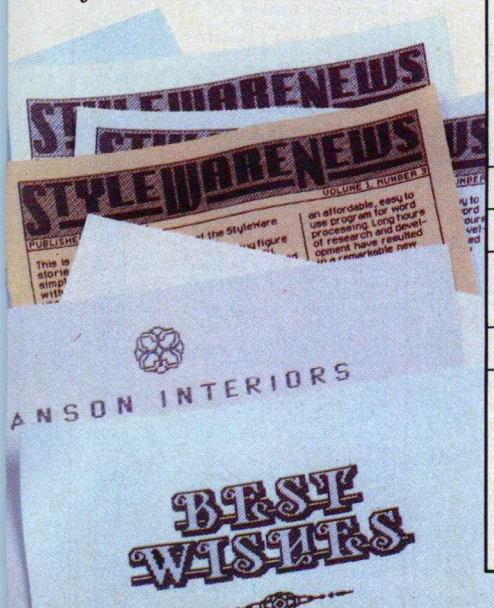

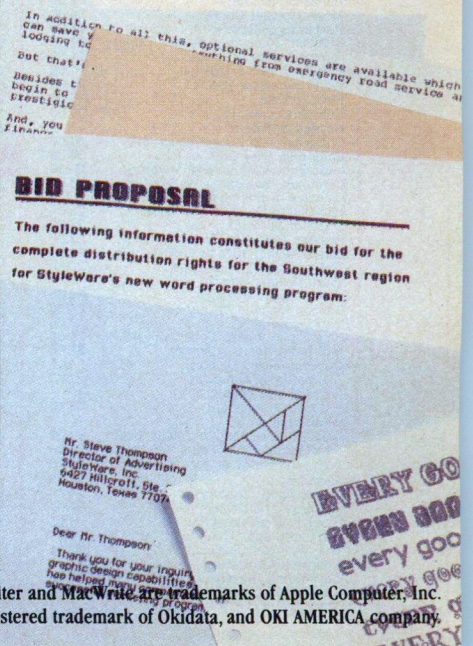

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APPLE III ALTER EGO

Titan Technologies' III Plus IIe lets your Apple III emulate a IIe.

There was a time when thousands of Apple II owners longed for a device that would allow their machine to emulate the Apple III. As irony would have it, they might now need to convert in the opposite direction, and Titan Technologies (formerly Saturn) has just the set of plug-in boards with which to do it.

At first, this product appears to be a downgrade—something akin to the Plug and Play kit that made my Okidata 92 printer act like an IBM Graphics (i.e., modified Epson MX-80) machine and, in the process, removed some of its best features)—but that is not the case here. In fact, Titan's III Plus IIe not only opens the Apple III's drives to virtually the entire Apple II and IIe software libraries, but it also enhances the III's natural functions.

Who would have believed it could come to this? I vividly recall the excitement surrounding the introduction of the Apple III a little over five years ago and the subsequent disappointment many of us shared when the first machine we laid eyes on—at a New York computer show—spewed garbage onto the screen, beeped pitifully, and died. As it turned out, this failed demonstration was not an isolated case of computer crib death, for Apple IIIs were popping their chips all over the country. I must admit that those of us who had invested one or two thousand dollars in an Apple II (and could ill afford to write that off and buy a III) breathed a sigh of relief when the first release turned out to be less than wonderful, but Apple quickly diagnosed and cured the malady, thus generating renewed interest—not to mention a certain amount of jealousy.

Apple II owners had mixed feelings about the III. On the one hand, we marveled at its 128K RAM, up- and down-arrows, numeric keypad, built-in 80-column uppercase and lowercase display, 16 colors, enhanced graphics, and "typeahead" buffer; on the other hand, many people worried that the Apple II was being superseded, and nobody wants to be stuck with an obsolete computer. Of course, the Apple II did not die, it simply spawned the IIe and IIc models, new generations that today happily coexist with it.

For the estimated 80,000–100,000 Apple IIIs still in use, the Titan cards represent a new lease on life.

For a variety of reasons, the Apple III did not fare as well. Some say it never quite recovered from its ill-fated start; others blame competition from Big Blue, which entered the microcomputer field with a solidly established image in the business community and placed its PCs on the very desks Apple had intended for its new machine. The final death knell—so the story goes—was sounded by Steve Jobs, who is said to have seen the III as a nuisance in the Macintosh's path. Notice that no one has blamed the machine itself; it remains an excellent computer that never got a chance to really prove its worth.

A New Lease on Life

Today, little or no new software is being written for the Apple III, but an estimated 80,000–100,000 units are still in use by a fiercely loyal group of owners, who will see the Titan cards as a new lease on their machine's life.

From the beginning, emulation of the Apple II and II Plus was a highly touted feature of the Apple III; its designers set out to create a business machine that serious Apple II owners could graduate to without rendering obsolete their accumulated software library. But the emulation went only so far: It enabled the Apple III to display the II's high-resolution graphics and 40-column text screens and to run virtually all programs that had been written for an unenhanced Apple II. The number of unenhanced IIs was rapidly diminishing at that time, however; many 80-column cards were on the market, and more and more applications programs were

PHOTOGRAPHY BY HAROLD WILLIAMS

written to take advantage of them.

Thus, Apple II emulation meant little to Apple III owners whose needs went beyond running games or the earliest application software packages. As it turned out, even game players fell victim to incompatibility, for neither of the III's two game ports worked in the Apple II mode—the term *joysticks* became a misnomer. The Titan III Plus IIe solves the joystick problem (it has an on-board 16-pin game socket), but, since it emulates the IIe's 80-column card rather than the old Videx or DoubleVision types, early 80-column Apple II programs remain incompatible. A PR#3 command invokes the 80-column feature, and some preboot programs might work, but Titan makes no guarantees in that direction. Since most of these game programs are now outdated, that handicap should be of little concern.

Installing the Titan

The III Plus IIe package comprises two Titan boards, one a modified version of a previously marketed Titan Apple II emulation card, the other a new IIe card. Owners of unmodified Titan Apple II emulation cards can send them to Titan for an upgrade that costs $175. Installing the two boards is a relatively easy task when you follow the furnished step-by-step instructions. Briefly, you first locate the video ROM on the motherboard and replace it with Titan's ribbon cable. A 24-pin connector on the other end of the cable goes into one of the Titan boards, which you press into slot 2 of the Apple III. You then link the two cards by way of another ribbon cable and place the second one in slot 3. Assuming that you have a parallel card in slot 1, you'll have only one vacancy left, which you can use for, say, a CP/M card.

Booting the Titan startup disk produces a menu (see figure 1) with three options: 1) START APPLE III OPERATION, 2) CHANGE IIe EMULATION, and 3) START APPLE IIe EMULATION. Option 2 yields a second menu, leading to options for

The Apple III was created to be a business machine that II owners could graduate to without rendering obsolete their software library.

```
SLOT 1 PRINTER SETTINGS
1) Baud rate is 9600
2) NO Parity
3) Data Format is 8 Bits
4) 1 Stop Bit
5) Line Length is OFF
6) Page Length is OFF
7) Line Feeds are ADDED
8) HI-BIT is DISABLED
ENTER CHOICE BY NUMBER
<RETURN> FOR PREVIOUS MENU
```

Figure 1: Titan configuration menu for serial printers connected to the Apple III's RS-232C port

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Ease of Use	EASY!
Value for the Money	★★★★

(Family Computing, June issue, 1986)

"I HAVE NEVER THANKED a company for making a product before this time . . . Thank you for giving me an easy-to-use Apple Writing System for my whole family. The BARD is a winner! I have never been able to get my wife to touch a word processor. Before the BARD, she found the world of word processing beyond her. Now she uses it (the Starter's level) several times a week (to write letters). Our daughter (the youngest) has gone through the tutorials and is our Experienced (level) user . . . in less than half an hour she was rolling.

"Our sons have now switched (from AppleWorks to the BARD). The Spell Checker was instrumental in this decision. I am an article writer for magazines . . . and write every day. The BARD (Professional level) has made my work easier and fun again! One simply sits down and uses the BARD. A few checks here and there the program rolls. I learned it in about a half hour and have been using it ever since. The speed of the editing and formatting keeps me moving . . . the "Quick" function macros let me keep a barrel of usable goodies a keystroke away. The simple use of different printer fonts unleashes the printer (this is the first program which included my Gemini 10x as a regular part of the program).

"Thank you for living up to your advertising and the support you offer. Please consider me an automatic new customer for any of your new products. Just send them along."

(The Rev. Philip G. Houghton, Waynesburg, PA.)

Bard features include: Preview full pages before printing • 30 Popular Printers Set-Up Automatically • 50,000 Word Spell Checker Built In 40/80 Column Versions • Macros • Cut & Paste • Find & Replace • Destructive Overwrite • Illustrated Manual & Much More.

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changing the serial-printer and communications settings (see figures 1 and 2). Changing a jumper on the board in slot 2 allows the computer to access a serial printer connected to the Apple III's built-in RS-232C port.

If you want to communicate with the outside world from the IIe mode, connect a modem to the serial port, and set the software accordingly. The Titan III Plus IIe software duplicates many of the Super Serial Card's functions, but not all, so you may run into trouble. I did not encounter any problems with the Hayes 300- and 1200-bps modems. If you are using the serial port for a printer, you probably don't have a parallel card in slot 1, and thus the solution to an eventual communications problem is to install the Super Serial Card, which the Titan cards can address if it has the proper jumper setting.

```
SLOT 2 COMMUNICATIONS SETTINGS
1) Baud rate is 1200
2) NO Parity
3) Data Format is 8 Bits
4) 1 Stop Bit
ENTER CHOICE BY NUMBER
<RETURN> FOR PREVIOUS MENU
```

Figure 2: Titan configuration menu for communications device connected to the Apple III's RS-232C port

Because it carries its own complement of 128K RAM, the Titan card set can take advantage of the IIe's double high-resolution graphics display, which has a resolution of 560 × 192 dots per inch. Not all graphics programs work with this enhanced mode, so option 3 on the second menu lets you toggle this feature on or off, and you can change all these settings in midstream by pressing the open-apple/Reset combination, which brings back the main menu. You can also move back and forth between the II and III modes without turning off the power.

Once you've configured the system, normal operation is a snap: Boot the startup disk, replace it with one containing the ProDOS or SOS system, and press the corresponding option number. If you want to see what kind of Apple IIe the Titan cards have turned your III into, run the ProDOS User's Disk and press S (for *Slot Assignments*). Figure 3 shows the screen that appeared on my machine.

```
DISPLAY SLOT ASSIGNMENTS

STARTUP DISK: /USERS.DISK/
YOUR Apple //e HAS:
   128K OF RANDOM ACCESS MEMORY
   APPLESOFT IN ROM
   SLOT 1: PARALLEL CARD
   SLOT 2: I/O CARD
   SLOT 3: 80-COLUMN CARD
   SLOT 4: EMPTY
   SLOT 5: PROFILE
   SLOT 6: DISK DRIVE
   SLOT 7: USED
PRESS RETURN TO DISPLAY MAIN MENU
```

Figure 3: With a parallel card in slot 1 and nothing in slot 4, the screen display shows how Titan's boards are emulating the IIe. Slot 5 is labeled PROFILE because it looks like a ProFile drive to the emulation, but it is actually the Titan's ProDOS RAMdisk.

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It looks great, but does it really work? You bet. The first program I tried was Word Perfect, and all went well until I had to delete a character and searched the Apple III keyboard in vain for a Delete key. The Titan people have solved the problem simply by giving Control-Shift-Backslash the same effect. Next I ran AppleWorks, with equally smooth results. In fact, the III can outperform the IIe, because even its numeric keypad and two-speed keystroke-repeat feature function properly in the IIe emulation mode.

All in all, a bona fide Apple IIe can do little that the $399 Titan III Plus IIe cards can't emulate.

When I spent a whole evening running every conceivable type of Apple II program on the III, I soon realized that anything I could run on my Apple IIe also ran on the emulated IIe. In each case, I made vain attempts to crash the program or, at the very least, run into a snag, but the real IIe duplicated the frustrations as well as the joys. When I had a slight problem with the graphics on Newsroom, the solution was to turn off the double-hi-res mode. Since Word Juggler, for a long time my favorite word processor, was originally written for the Apple III, it made little sense to run the IIe version in the emulation mode, but I tried it anyway, and it also worked splendidly. The only Apple IIe program that refused to run was SuperCalc 3a, but it failed only because it requires a CMOS 6502 (65C02B) microprocessor. Not really a problem, because this chip, which you find in the Apple IIc and newer IIe computers, is easy to install in the Apple III, replacing the NMOS 6502B.

RAM Bonuses

The Titan startup disk contains two RAMdisk programs, one of which activates automatically. It checks to see how much memory your Apple III has in its main memory and then installs as much of that as possible as a RAMdisk. In the case of a 256K Apple III, that means a 192K RAMdisk—enough to hold a good dictionary, for example. Although installation is automatic, you have to format the RAMdisk before you can use it.

I mentioned at the beginning of this review that the Titan cards enhance Apple III operation, and this improvement involves an SOS RAMdisk, which requires more setup work, but is well worth the trouble. The Titan startup disk contains an SOS RAM driver that you must first transfer to your application disk by way of the Systems Configuration Program (SCP). If the disk has insufficient space, you can set up a two-stage loading procedure. For you experienced SOS users, the configuration should be a breeze; others may find it slightly complicated, but the Titan manual contains clear, step-by-step instructions.

I was sorry to discover that the Titan cards couldn't address my high-capacity Micro Sci A143 floppy drive in IIe emulation, but I'm not so sure that I can't do something to rectify that. On the other hand, they do work with a ProFile hard disk and (under ProDOS) the Apple III's clock/calendar chip. The Titan emulator doesn't provide flashing characters and MouseText (icons) either, but wouldn't you really rather have the other extras?

All in all, a bona fide Apple IIe can do little that the $399 Titan III Plus IIe cards can't emulate. That versatility and the aforementioned RAMdisk features make this a highly recommended addition to any Apple III. It might even serve as an inducement to purchasing a III, which (I am told) has dropped to about $400 on the used market. +

Chris Albertson is a New York music critic who has been using Apple computers since 1979.

PRODUCT INFORMATION

Titan Technologies, Inc.
Distributor:
Sun Data
851 North Main
Logan, UT 84321
(800) 821-3221
List Price: $399 (upgrade of Titan II card, $175)
Requires: Apple III, ProDOS

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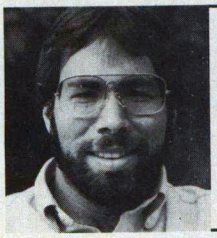

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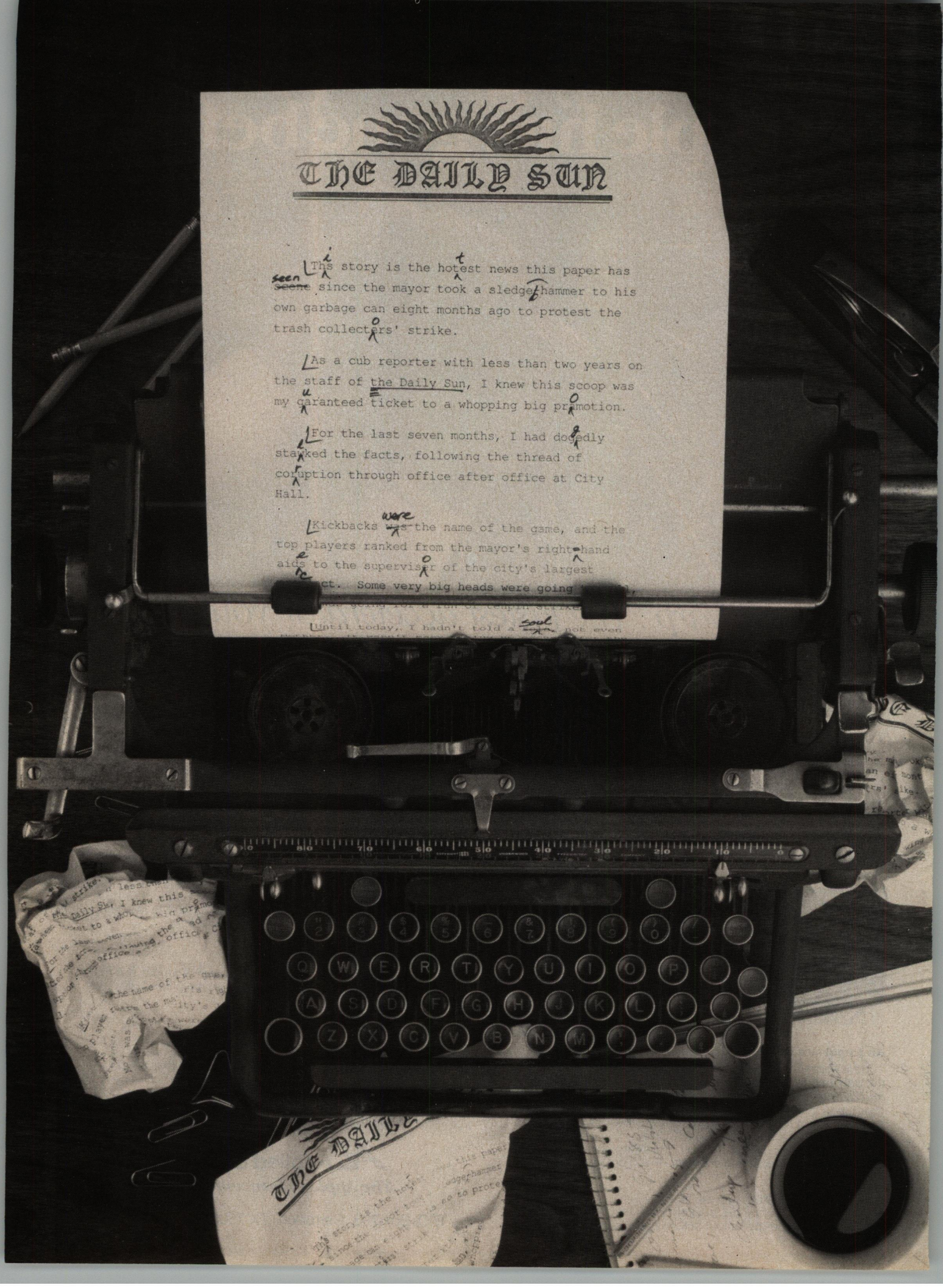
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This story is the hotest news this paper has seen since the mayor took a sledge hammer to his own garbage can eight months ago to protest the trash collectors' strike.
As a cub reporter with less than two years on the staff of the Daily Sun, I knew this scoop was my garanteed ticket to a whopping big promotion.
For the last seven months, I had doggedly stalked the facts, following the thread of corruption through office after office at City Hall.
Kickbacks was the name of the game, and the top players ranked from the mayor's right-hand aids to the supervisor of the city's largest
Some very big heads were going
Until today, I hadn't told a soul
THE DAILY

Spell It ~~Write~~ Right

The latest in orthographic aids for Apple II word processing

This story is the hotest news this paper has scene since the mayor took a sledge-hammer to his own garbage can eight months ago to protest the trash collecters' strike.

As a cub reporter with less than two years on the staff of the *Daily Sun*, I knew this scoop was my garanteed ticket to a whopping big pramotion.

For the last seven moths, I had dogedly stawked the facts, following the thread of coruption through office after office at City Hall.

Kickbacks was the name of the game, and the top players ranked from the mayor's right hand aids to the superviser of the city's largest presinct. Some very big heads were going to to roll, and I was going for a run of tenpin strikes!

Until today, I hadn't told a sole, not even Mother. It wasn't easy making up excuses for the hours I spent night after night tailing suspects. Mother said I was neglecting her, but I knew she suspected another woman. After all, I'm all she's got since Dad dies, she reminds me every morning as she serves me my sof boiled egg on toast.

Anyway, all will be forgiven when I tell her the turth tonight and announce my pramotion.

Here comes the editor-in-shief now with my story in hand! A quick ajustment of my glasses—they've got heavy black frames and a bad habit of falling down my nose when I'm typing. It wouldn't do to face the turning point in my career with my glasses asque.

"Bailey?" he says in that gruff, tobaco-stained voice I love and fear so much.

"Yessir!" I say, pride already putting a sizable lump in my throat.

"Is there any hope of your ever lerning how to spell?"

As many of us know so well, no matter how hot the story or how important the information, spelling and typographical errors reflect poorly on a writer. In the case of business letters and press releases, the bad impression can go beyond the writer and reflect poorly on the company he or she represents.

If the sad tale of the cub reporter strikes a chord in you, you'll be relieved to know that help is on the way. Software publishers have trained a valuable and powerful player to add to the word-processing team. Spelling checkers, either stand-alone or built into word-processing programs, have reached a peak in terms of speed, ease of use, automatic correction capabilities, and even the incorporation of some artificial-intelligence techniques. Fulfilling a broad range of requirements, from those of young students writing term papers to those of professional journalists, spelling checkers are a must if you strive for perfection in your written communications (and who doesn't?).

Word-processing programs may include a built-in spelling checker, or the manufacturer may provide a spelling checker that works with the word-processing program. Spelling checkers fall into three main categories. Those that are included in, or can be installed into, a word-processing program are considered integrated, because you do not have to leave the word-processing program to check the spelling of your documents. The second group works with specific word-processing programs, and the third group works with any word-processing program that saves documents as ASCII text files. The spelling checkers in the latter two categories require you to leave the word-processing program and then start the spelling-checker application in order to check your documents.

If you already own a word-processing program, look for a spelling checker that works specifically with your program. If your word-processing program is not listed in the chart that accompanies this article but saves documents as ASCII text files, you are still in luck.

This review will cover the the best-known spelling checkers for the Apple II series and a few recent arrivals. The chart that follows presents the remaining programs and their basic features.

PHOTOGRAPHY BY PACIFIC HORIZONS

Although spelling checkers offer a variety of capabilities, the basic operating premise is the same for all of them. They all contain a dictionary database, but some programs have more words in the database than others do, and almost all allow you to add your own words. When you begin spell-checking, the program instructs you to load your document (unless the checker is integrated with your word-processing program, in which case you can spell-check without leaving the word-processing program) and compares the data, or words, in your document to the words in its dictionary database. If a word is not in the program's dictionary database, the spelling checker lets you know, in most cases, by highlighting the word in context.

Of course, the more words a spelling checker's dictionary has, the more effective and complete the correcting job will be. No spelling checker can take the place of a good human proofreader for complete accuracy, however. As we delve deeper into the correcting process, you'll see why.

The first thing you'll want to ascertain in choosing a spelling checker is which programs can work with your word-processing program. If you haven't yet purchased a word-processing program, you'll want to consider those with built-in spelling checkers. In general, you can save time by eliminating the need to switch disks if the spelling checker is integrated with a word-processing program.

Two valuable features to look for in a spelling checker are the ability to suggest alternative spellings and the provision for you to scroll through the program's electronic dictionary, thereby eliminating the need to leave your work to search through a printed dictionary if the program does not come up with the correct alternative spelling to a misspelled word. In general, you can choose one of the alternative words and prompt the program to replace the word automatically with your choice, or you can type a replacement directly into your document.

The suggested alternative spellings are usually based on words listed close to the misspelled word in the dictionary that use similar letters. They appear, with instructions and options, in a "proofing window" next to your document. Sometimes they're amazingly helpful, sometimes not. For instance, the incorrect word *presinct* in

Spelling Checkers

PRODUCT	COMPATIBLE WITH	TYPE	PRICE	# WORDS IN DICTIONARY
Bank Street Speller Brøderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1700	Bank Street Writer	Stand-Alone	$69.95	30,000
Haba Spell It Haba Systems, Inc. 6711 Valjean Avenue Van Nuys, CA 91406 (818) 901-8828	AppleWorks word-processing program	Stand-Alone	$49.95	33,000
Magic Words Artsci, Inc. 5547 Satsuma Avenue North Hollywood, CA 91601 (818) 985-5763	Magic Window (all versions), AceWriter, any ASCII file	Stand-Alone	$69.95	14,000
MECC Speller (A134) MECC (Minnesota Educational Computing Corporation) 3490 Lexington Ave. North St. Paul, MN 55126-8097 (612) 481-3500	MECC Writer, Apple Writer II	Stand-Alone	$39	10,000+
MegaWorks Megahaus Corporation 5703 Oberlin Drive San Diego, CA 92121 (619) 450-1230	AppleWorks word-processing program	Stand-Alone	$125 (includes mail merge)	40,000
Pinpoint Spelling Checker Pinpoint Publishing Box 13323 Oakland, CA 94661 (415) 654-3050	AppleWorks word-processing, database, and spreadsheet programs	Integrated	$69	61,000
PowerSpell Beaman Porter, Inc. 417 Halstead Avenue Harrison, NY 10528 (914) 835-3010 (914) 835-3156	PowerText	Stand-Alone	$50	6000+
Random House Proofreader Digital Marketing 1136 Saranap, Ste. P Walnut Creek, CA 94595 (415) 947-1000	WordStar and approx. 200 other word-processing programs	Stand-Alone	$50	32,000
Sensible Speller ***Sensible Speller IV*** Sensible Software, Inc. 210 S. Woodward, Ste. 229 Birmingham, MI 48011 (313) 258-5566	Most major word-processing programs, any ASCII text file	Stand-Alone	$125	80,000+
Spellbound Quorum Internationale, Unlimited Box 2134APE Oakland, CA 94621 (415) 769-6080 (800) 222-2824 In CA (800) 222-2812	AppleWorks word-processing program	Integrated	$49.95	1000

MAKES ADDITIONS TO MAIN DICTIONARY	CREATES PERSONAL DICTIONARY	DISPLAYS SUSPECT WORDS IN CONTEXT	SUGGESTS SPELLING	SCROLLS DICTIONARY	WILD-CARD CHARACTERS FOR SEARCHING DICTIONARY	REQUIRES	OPERATING SYSTEM	UNIDISK 3.5 ALSO
■	■	■	■	■	■	Apple II Plus, IIe, or IIc; 2 disk drives	N/A	
	2 disk drives required							
	■	■	■	■	■	Apple IIe with Extended 80-Column Card, or IIc	ProDOS	
	2 disk drives recommended							
■	■	■				Apple II, II Plus, IIe, or IIc	DOS 3.3	
■						Apple IIe or IIc	DOS 3.3	
■		■				Apple IIe with 128K RAM, or IIc	DOS 3.3	■ read only
	■	■	■			Enhanced Apple IIe with Extended 80-Column Card, 2 disk drives, extra RAM, speed-up card, and UniDisk 3.5 recommended, or IIc	ProDOS	■
	2 disk drives required							
■	■	■				64K version: Apple II or II Plus, 64K RAM, 2 disk drives; 128K Version: Apple IIe, 128K RAM, or IIc; 2 disk drives	Pascal 1.2	
	2 disk drives required							
■		■	■			CP/M card	CP/M	
■	■	■	■	■	■	Apple II Plus with 64K RAM, IIe, or IIc	ProDOS (SS) DOS 3.3 (SSIV)	
	2 disk drives required							
■	■	■	■	■		Apple IIe with Extended 80-Column Card and 128K RAM, or IIc	ProDOS	

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INTERFACE MODULES
39. 64K & 80 Column Card (IIe)
49. Floppy Drive Controller (II+, IIe)
155. Full Ht 143K Floppy Drive (IIe)
155. Half Ht 143K Floppy Drive (IIe)
155. Half Ht 143K Floppy Drive (IIc)
KENSINGTON
69. System Saver Fan
KOALA
75. Touch Tablet
ORANGE MICRO
49. Hot Link Serial To Parallel Cable (IIc)
79. Grappler Plus or Grappler C
135. Buffered Grappler Plus
QUARK
995. 10 MB Hard Disk (IIe, IIc, Or Mac)
SMT
39. Parallel Interface And Cable (II+, IIe)
TG PRODUCTS
19. Joystick (IIe, IIc)
TITAN
155. 128K RAM Card
229. Accelerator IIe
TRACKHOUSE
79. Numeric Keypad (IIe)
VIDEX
179. Videoterm 80 Column Card
189. Ultraterm 132 Column Card
25. Soft Video Switch

DISKETTES

CONROY-LAPOINTE
$ 13. 10 ea. 5¼" SS/SD (Apple)
99. 100 ea. 5¼" SS/DD (Apple)
25. 10 ea. 3½" SS/DD (Mac)
115. 50 ea. 3½" SS/DD (Mac)
29. 10 ea. 3½" DS/DD (Mac)
115. 50 ea. 3½" DS/DD (Mac)
259. 100 ea. 3½" DS/DD (Mac)
MAXELL
13. 10 ea. 5¼" SS/DD (Apple)
32. 10 ea. 3½" DS/DD (Mac)

MONITORS

AMDEK
$119. 300G 12" Green Composite
129. 300A 12" Amber Composite
ZENITH
109. 1220 Amber Composite
109. 1230 Green Composite

6. RCA Monitor Cable

PRINTERS

EPSON
$289. AP 80 75 cps, 15 NLQ
389. FX 85 160 cps, 32 NLQ
STAR MICRO
289. NX 10 120 cps, 25 NLQ
379. SD 10 160 cps, 40 NLQ
PANASONIC
269. P 1091 120 cps
SMT
39. Parallel Card With Cable
CENTRAL POINT
19. Laser 128 Parallel Printer Cable

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US ROBOTICS
$299. 1200 External
499. 2400 External

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$ 29. Diamond 6 Outlets
35. Emerald 6 Outlets, 6' Cord
46. Sapphire 3 Outlets, RFI Filter
55. Ruby 6 Outlets, RFI Filter, Cord

UTILITY SOFTWARE

BORLAND
$ 42. Turbo Pascal (Requires CP/M)
36. Turbo Toolbox
CENTRAL POINT
23. Copy II Plus
DATA TRANSFORMS
63. Fontrix
FUNK
37. Sideways (DOS 3.3 Or ProDOS)
MICROSTUF
109. Crosstalk (Requires CP/M)
OMEGA
75. Locksmith
TERRAPIN
59. Logo
UNITED
79. ASCII Express (DOS 3.3 Or ProDOS)
VIDEX
35. Appleworks Modifier

BUSINESS SOFTWARE

ASHTON-TATE
305. dBase II (Requires CP/M)
BPI
219. Gen. Accounting, AR, AP, PR (IIe)
235. Gen. Accounting, AR, AP, PR (ProDOS)
DOW JONES
145. Market Manager Plus
199. Market Analyzer
LIVING VIDEOTEXT
89. Think Tank
MEGAHAUS
75. Megaworks Or Reportworks
MICROPRO
265. WordStar Professional
MICROSOFT
62. Multiplan (DOS)
PINPOINT
42. Pinpoint
QUARK
79. Word Juggler & Lexicheck
SSI (SATELLITE)
99. WordPerfect
SOFTWARE PUBLISHING
79. PFS: File, Write, Graph Or Report

GAMES

ELECTRONIC ARTS
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HAYDEN
30. Sargon III
INFOCOM
29. Hitchiker's Guide Or Zork I, II Or III
MICROPROSE
23. F-15 Strike Eagle
SPECTRUM HOLOBYTE
25. GATO (Requires 128K)
30. Orbiter Or Tellstar I (IIe, IIc)
49. Tellstar II (IIe, IIc)
SUBLOGIC
33. Flight Simulator II

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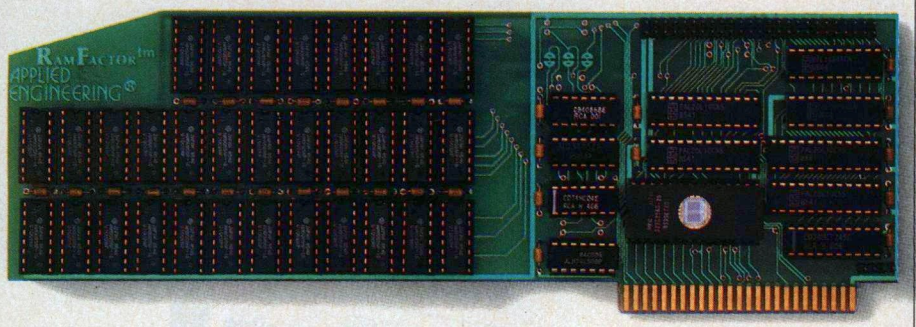

Very Compatible

All the leading software is already compatible with RamFactor. Programs like AppleWorks, Pinpoint, BPI, Managing Your Money, Dollars and Sense, SuperCalc 3A, PFS, MouseWrite, MouseDesk, MouseCalc, Sensible Speller, Applewriter IIe, Business Works, ReportWorks, Catalyst 3.0 and more. And RamFactor is fully ProDos, DOS 3.3, Pascal 1.3 and CP/M compatible. In fact, no other memory card (RamWorks excepted) is more compatible with commercial software.

AppleWorks Power

There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", and hard disks. All this performance is available to anyone with an Apple IIe *or* II+ with an 80 column card. RamFactor, no other standard slot card comes close to enhancing AppleWorks so much.

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the sample document is somewhat removed from the correctly spelled *precinct* in the dictionary, so suggested spellings would be something like *prescient* or *prescience*. If you don't have a clue how to spell the word, your alternatives are to scroll through the words beginning with *pre* in the program's dictionary or to ask the person in the next office.

No spelling checker can catch words spelled correctly but used incorrectly. For example, take the words *scene* and *sole* in the sample document. Since both words appear in most spelling-checker dictionaries, they pass as correct.

A nice feature common to all the programs in this review is that they let you customize their dictionaries to fit your personal writing needs, either by adding your own words to the spelling checker's database or by creating a dictionary from scratch on a separate disk. So if you work with a lot of terms that the spelling-checker dictionary lacks, you can add those words to your program's dictionary as you create documents. Many specialized dictionaries, already compiled and available on disk, cover legal, medical, and techni-

SPELLING CHECKERS, CONTINUED

PRODUCT	COMPATIBLE WITH	TYPE	PRICE	# WORDS IN DICTIONARY
Spell Perfect LJK, Inc. 7852 Big Bend Blvd. St. Louis, MO 63119 (314) 962-1855	Letter Perfect, Simply Perfect, any ASCII file	Stand-Alone	$79.95	30,000
Spellworks Advanced Logic Systems 1195 East Arques Ave. Sunnyvale, CA 94086 (408) 730-0307	AppleWorks word-processing program	Stand-Alone	$49.95	90,000
The Speller Palantir Software 12777 Jones Road, Suite 100 Houston, TX 77070 In TX (713) 955-8880 (800) 368-3797	The Word Processor, any ASCII text file	Stand-Alone and Integrated	$145	60,000
Webster's New World Spelling Checker Simon & Schuster Gulf+Western Bldg. 1 Gulf+Western Plaza New York, NY 10023 (201) 592-2900	Apple Writer II, Bank St. Writer, PIE:Writer, Screen Writer II, Perfect Writer, Textra, Word Perfect, AppleWorks word-processing program, any ASCII file	Stand-Alone	$59.95	114,000
WordPerfect V.1.0 WordPerfect Corp. 288 West Center Street Orem, UT 84057 (801) 227-4370	WordPerfect	Integrated	Upgrade $30	50,000+

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*Sensible Speller ProDOS works with the following word processors, AppleWorks, AppleWriter-ProDOS version (Apple Computer, Inc.); Format II Enhanced-ProDOS (Kensington Microware); Mouse Write-text files (Roger Wagner Publishing); MouseWord (International Solutions); PFS:WRITE-ProDOS (Software Publishing, Inc.); Word-Talk (Computer Aids) and WordPerfect (SSI Software); Word Juggler (Quark Inc.); Writing Wizard (Scarborough Systems); Zardax-ProDOS (Computer Solutions); and others. Owners of trademarks indicated in parentheses. Black's Law Dictionary (West Publishing, Inc.); Stedman's Medical Dictionary (Waverly Press, Inc.).

Sensible Software, Inc. 210 S. Woodward, Suite 229, Birmingham, MI 48011 (313) 258-5566

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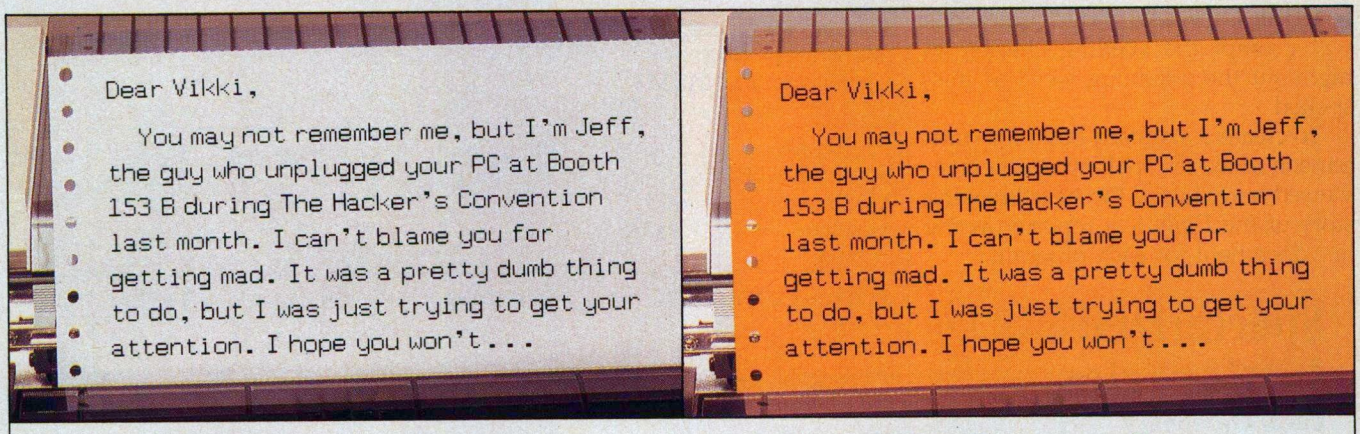
■	■	■	■			Apple II Plus, IIe, or IIc	DOS 3.3	
■	■ 2 disk drives recommended					Apple IIe with 128K RAM, or IIc	ProDOS	
■	■	■	■	■	■	Apple II Plus with 64K RAM, IIe, or IIc; CP/M card	CP/M	
	■	■	■	■		ProDOS: Apple IIe with 128K RAM, or IIc DOS 3.3: Apple II Plus with 64K RAM, IIe, or IIc	DOS 3.3 and ProDOS	
■	■ 2 disk drives required	■	■	■	■	Apple IIe with 128K RAM, or IIc, 2 disk drives recommended	ProDOS	



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cal terms (see listing below).

If you need to create a separate dictionary disk, you will likely require two disk drives. Two disk drives are essential anyway if you don't want to waste a lot of time switching back and forth between your document and stand-alone spelling checkers as you work your way through the correction process.

Occasionally, all writers encounter a word that completely stumps them. Some spelling checkers offer a way to deal with these mystery words. You can substitute "wild-card characters" for one or more letters of a word you don't know how to spell. The program then searches the dictionary for similar words containing the letters you do know, in the same relative position. Think what you could do with crossword puzzles!

In addition, spelling checkers provide you with useful statistics on your documents. Most give you a total word count, a list of the unique words and how many times each word appears, the number of "suspect" words, and the number of corrections you made. If you plan to embed commands in your document, in most cases you must do so after you've corrected it. Otherwise, your commands will prompt the spelling checker to highlight the adjoining word as misspelled.

To create a standard basis for comparison of the ten spelling checkers reviewed here, I used the heartbreaking story of the *Daily Sun* reporter as the test document for each program.

Specialized Dictionaries

Legal Dictionary
8,000 words, $85
Quark Incorporated
2525 W. Evans, Ste. 220
Denver, CO 80219
(303) 934-2211, 934-0784 after 2 P.M.

Stedman's Medical Dictionary
65,000 words, $39.95
Sensible Technical Dictionary
22,000 words, $39.95
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Sensible Software, Inc.
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Birmingham, MI 48011
(313) 258-5566

WORD-PROCESSING PROGRAMS WITH Spelling Checkers

PRODUCT	COMPATIBLE WITH	TYPE	PRICE	# WORDS IN DICTIONARY
The Bard's "Pro-Am" Apple IIe/c Writing System Writing Software International 110 E. Broadway, Ste. 600 Missoula, MT 59802 (406) 543-3141	The Bard's "Pro-Am" Apple IIe/c Writing System	Integrated	$69.95	50,000
Better Working Word Processor Spinnaker Software One Kendall Square Cambridge, MA 02139 (617) 494-1222	Better Working Word Processor	Integrated	$59.95	50,000
Home Word Plus Sierra On-Line P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858	Home Word Plus	Integrated	$69.95	35,000
Mouse Write V.2.6 Roger Wagner Publishing, Inc. 10761 Woodside Ave. P.O. Box 582 Santee, CA 92071 (619) 562-3670	Mouse Write V. 2.6	Integrated	$149.95	60,000
Perfect Writer Thorn EMI Computer Software, Inc. 285 Millrose Road Chelmsford, MA 01824 (617) 256-3900	Perfect Writer, any ASCII file	Integrated	$139	50,000
PFS:Write Software Publishing Corp. 1901 Landings Drive Mountain View, CA 94043 (415) 962-8910	PFS:Write, any ASCII file	Integrated	$125; upgrade, $35	75,000
ScreenWriter II Sierra On-Line P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858	ScreenWriter	Stand-Alone	$129.95	38,000
Word Juggler Quark Incorporated 2525 W. Evans, Ste. 220 Denver, CO 80219 (303) 934-2211 (303) 934-0784 after 2 P.M.	Word Juggler	Integrated	$99	50,000
WordPerfect V.1.0 WordPerfect Corporation 288 West Center Street Orem, UT 84057 (801) 227-4370	WordPerfect	Integrated	$179	50,000+
WordStar Professional MicroPro International Corporation 33 San Pablo Road San Rafael, CA 94903 (415) 499-1200	WordStar Professional	Integrated	$495	65,000

MAKES ADDITIONS TO MAIN DICTIONARY	CREATES PERSONAL DICTIONARY	DISPLAYS SUSPECT WORDS IN CONTEXT	SUGGESTS SPELLING	SCROLLS DICTIONARY	WILD-CARD CHARACTERS FOR SEARCHING DICTIONARY	REQUIRES	OPERATING SYSTEM	UNIDISK 3.5 ALSO
						Apple IIe or IIc	DOS 3.3	
						Apple II Plus, IIe, or IIc	DOS 3.3	
	No, part of main dictionary					Apple IIe with 128K RAM, or IIc	ProDOS	
	2 disk drives recommended		up to 10	Main, no; personal, yes		Apple IIe enhanced or IIc	ProDOS	
	2 disk drives recommended					Apple IIe or IIc	DOS 3.3	
				Main, no; personal, yes		Apple IIe with Extended 80-Column Card, or IIc	ProDOS	
						Apple II, II Plus, IIe or IIc; 48K RAM, 128K RAM recommended	DOS 3.3	
						Apple IIe with 128K RAM, or IIc	ProDOS	
	2 disk drives required					Apple IIe with 128K RAM, or IIc; 2 disk drives recommended	ProDOS	
						CP/M card	CP/M	

No spelling checker can take the place of a good human proofreader for complete accuracy.

Bank Street Speller

Designed to work exclusively with Bank Street Writer, this program, like the word-processing program, is ideal for families with young students. The spelling checker is easy to use and consists of a single disk with the program on one side and a dictionary of more than 30,000 words on the other. Bank Street Speller lets you assign passwords to your text files.

As with most spelling checkers, when you boot it and load your text file, the program tells you how many words your document contains and how many of those words are not in the program's dictionary. It also lists all the unique words in your document by letter, tells you how many times each word appears in the document, and prints the list. Educators will appreciate this feature for language study.

As you encounter each highlighted word in your document, the program gives you the option of ignoring it and going on, replacing it, getting a suggested spelling, adding it to the dictionary, or searching the dictionary. Ignoring words is an option in all spelling checkers because they highlight words such as proper names, addresses, jargon, and unusual words that are correct but not in the spelling-checker dictionaries. If you plan to use those words often, you can add them to the dictionary.

Bank Street Speller incorporates the valuable wild-card option. Referring to the sample document, let's say I have no idea how to spell *garanteed* correctly. The suggested spellings are no help, so I type in *g====teed*, using = as my wild card. The program gives me the correct spelling, *guaranteed*.

Two disk drives make life with Bank Street Speller a lot easier and are an absolute necessity for making your own dictionaries on separate disks.

The Bard's "Pro-Am" Apple IIe/c Writing System

Integrated with a new, multilevel word-processing program (which, by the way, looks quite interesting), The Bard's spelling checker contains a 50,000-word dictionary. You can add words to this dictionary, but you can't create your own dictionaries on separate disks.

The program suggests alternative spellings and lets you scroll through its dictionary to find words, but it lacks a wild-card option.

The Bard's Insert Mark option lets you mark words or phrases with an asterisk. Then, using the Find feature of the word-processing program, you can locate those marks to make changes you can't make with the spelling checker activated.

When making corrections, you can either type in the new word or choose from one of the suggested spellings and press Return. The new word automatically replaces the incorrect one, with any capital letters or punctuation automatically substituted.

Better Working Word Processor

Better Working, a word-processing program with built-in spelling checker, highlights suspect words in your document that it doesn't find in its 50,000-word dictionary—but it stops short right there.

Although you do have the options of ignoring, changing, and adding words to the dictionary, you must come up with the correct spelling

On the Horizon

I was able to get only preliminary versions of two of the spelling checkers I tested. By the time you read this article, they should be available in final form. Try to find a dealer that will let you test the software before you make a buying decision.

Pinpoint

Designed for installation as a Pinpoint desk accessory in AppleWorks, the Pinpoint spelling-checker dictionary contains 50,000 words. Installation of the program was tricky.

Once I was in AppleWorks, however, the spelling checker was very easy to use, even more uncannily accurate at coming up with correct spellings for my errors than the PFS:Write program was. Like the PFS:Write spelling checker, Pinpoint does not give you the option of scrolling through its dictionary. You can make additions to the dictionary, however, and create your own dictionaries as text files. Before you quit your document, the program gives you a summary of the number of words in your document, the number of suspect words, the number of corrections it has made, and the number of words you've added to the dictionary. One handy feature: When you install Pinpoint's spelling checker, the installation program asks you to specify which version of AppleWorks you're using and reformats accordingly.

Spellbound

If you're willing to spend some time personalizing a spelling checker to fit your needs, then Spellbound may be for you.

This spelling checker is unique. Designed to work exclusively with AppleWorks in real time—in other words, as you are typing your document—the program uses a beep to alert you to an error.

Spellbound's dictionary comprises 1000 words that the publisher has determined to be the most frequently used and misspelled words in the English language. So, until you've spent time creating your own personal dictionary, Spellbound is useful only as a typo catcher.

The program caught minor slips such as *was t* for *wasn't* (but not *wasnt*), *gong* for *going* and *cty* for *city*. It did not catch any of the major misspellings in the sample document, however.

According to the publisher, Spellbound is programmed to catch only these four types of spellings errors, which, he has determined, represent 90–95% of all spelling errors: the use of the wrong letter, the insertion of an extra letter, the omission of a letter, or the transposition of two letters. If your error does not fit into one of these categories, you're stuck with it. The program features a special Autopilot option, which, when activated, automatically replaces misspelled words while you charge on with your typing.

Although Spellbound represents a unique concept, if your needs are complex and you produce long documents with many different words, the program is not powerful enough to meet those requirements. The version I used was erratic, and I would not want to have to rely on Spellbound if my life depended on producing a perfectly spelled document.

Sensible Speller rates very high as a valuable writer's tool.

without any assistance from the program. It gives you no suggested spellings, and the program lacks the capability of scrolling through its dictionary to look for possibilities. So you must use a printed dictionary to find the correct word, type it into a box at the bottom of the screen, and press Return to substitute the correct word for the misspelled one.

PFS:Write

Integrated with the PFS:Write word-processing program, the PFS spelling-checker dictionary is fixed at 75,000 words, and you can create as many personal dictionaries as you need. Each personal dictionary can contain up to 200 words, and you can save them to separate disks. These personal dictionaries are treated as Write documents, so you can delete and add to them as easily as you can to any other document.

This spelling checker was uncannily good at coming up with the correct spellings of the misspelled words in the sample document, a real tribute to the language skills of the designers. This ability is especially important because you do not have the option of scrolling through the electronic dictionary. So if you don't find the correct spelling for your word listed in the alternatives, you must search through a printed dictionary.

The program automatically replaces capitals and punctuation, catches words typed twice, and prompts you if you try to replace a misspelled word with another word not in its dictionary.

A unique feature gives you the option of checking just one word in a document, which you choose by positioning the cursor and pressing open-apple-X. An interesting aside: The only suggested correction for *turth* in the sample document was *tush* (a long pointed tooth, or Yiddish for buttocks).

Sensible Speller

If your word-processing program stores its files by using Apple's ProDOS operating system, then this latest and most powerful version of Sensible Speller will work for you (see "Sensible Grammar" for a brief look at a useful companion program). It works with AppleWorks, Apple Writer (ProDOS), Word Juggler, and MouseWord.

The spelling checker includes a fast and easy utility that you use to customize the program to work with your word-processing program. The package includes a program disk and an 80,000-word dictionary disk. You have the option of adding words to the main dictionary or creating your own dictionary disks. The program gives you a total word count for your document, as well as the number of unique words and the number of times each word appears.

When you begin correcting, your options are to add the highlighted word to the dictionary, ignore it, request a suggested spelling, look the word up in the program's dictionary, mark the word so you can find it later with the word processor, or correct the word by typing in a replacement.

The program allows you to scroll through its dictionary and also to use wild-card characters. Sensible Speller has two handy additional features. You can set it up to ignore characters such as embedded commands, acronyms (such as USA), and numbers. The program can also list all the words you've modified during the correction process with the new spellings listed opposite them. If you're a chronic misspeller, these lists can be quite helpful in curing your affliction. In fact, Sensible Speller rates very high as a valuable writers' tool, and I strongly recommend it to professionals.

Spellworks

For use with AppleWorks exclusively, Spellworks contains a 90,000-word dictionary. The program has some major drawbacks, however. Spellworks is the only spelling checker in this group that doesn't display your misspelled words in context. It does display the words alone on the screen in the order they appear in your document or saves them to a Misspell file on your AppleWorks document disk. You must then return to AppleWorks and open the Misspell file, where the words are displayed in alphabetical order.

The inconvenience of this method is obvious. In order to make your corrections, you must manually compare your printed document to the list, look up the correct spellings in a printed dictionary, and then go back and make corrections. Furthermore, Spellworks doesn't help you find the correct spellings.

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•Package of Computer Paper
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Prometheus 300C IIc	119	89
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CIRCLE 141 ON READER SERVICE CARD

Webster's New World Spelling Checker

The Webster's program is compatible with ASCII text files, Apple Writer II, Bank Street Writer, HomeWord, Magic Window II, PIE Writer, and Screenwriter II. This program offers a 114,000-word dictionary and some unique and time-saving features.

First, it has four different "scan levels" for finding words in its sizable dictionary. If you make few spelling errors and typos, you can use the Manual scan,which rapidly searches the document for errors without suggesting alternate spellings. A Quick scan searches only in the general alphabetic vicinity of the word in question but does suggest alternate spellings. Full scan gives you the most thorough word search and is the most time-consuming. Automatic scan claims to use an artificial-intelligence technique for determining where to search in the dictionary, based on the kinds of errors you've made in past documents.

The Webster's program caught more errors than any other spelling checker did.

Since I ran only one document through Webster's spelling checker, I can't say how accurate the artificial-intelligence technique is. But I will say that Webster's caught more errors in my sample document than any other spelling checker did, and the program was very good at suggesting the correct spelling. For instance, it was the only program to provide the correct spelling of *sledgehammer*. The program also catches double-word typos, such as *to to*.

Sensible Grammar

Sensible Software, maker of Sensible Speller, offers another writing aid many writers will find useful. Sensible Grammar catches most punctuation and spacing errors and singles out more than a thousand "misused phrases" with speed and precision. Unfortunately, its abilities as a grammar checker are not as extensive as you might wish and possibly never can be, given the complex set of rules that govern English grammar. Sensible Grammar's value simply depends on the types of mistakes you make and how frequently you make them.

Designed to be used with a mouse, Sensible Grammar works just as easily without one. The Check option is the heart of the program. With it you can check your document for punctuation errors, grammar errors, or both. In most cases, you will probably choose both, and when you do, Sensible Grammar loads the punctuation list and each of the error lists that you have selected. Next, you enter the name of the document to be checked, and Sensible Grammar begins its search, sentence by sentence, with a forward and backward motion, as it compares each sentence against its list of possible errors.

To help with the editing process, Sensible Grammar uses a series of overlapping windows to indicate its location in your document. The rear window, whose left edge is only partially visible, traces the program's movement through the document, while sentences with problems appear in the front window. If the program tags a punctuation error, it offers you the options of ignoring it, marking it, or having the sentence and a description of the error sent to the printer. If it finds a grammatical error, you can also enter a correction or have the program suggest one. Editing continues until you've reviewed your entire document.

Advantages

Sensible Grammar singles out many common typographical errors, including words that have accidentally been typed twice in a row; single occurrences of brackets, quotation marks, or other punctuation marks normally used in pairs; and incorrect or inconsistent spacing adjacent to punctuation marks. It can even check to see whether commas are being overused and suggests semicolons as alternatives in some places.

Another group of Sensible Grammar options focuses on word and phrase selection. You can, for example, choose to include complex legal terms in your document or have them translated into simple English. Simi-

In addition, the Webster's program automatically replaces capital letters and punctuation and catches errors you make when you are typing replacement words. I highly recommend this program to professionals who demand high standards of accuracy in their writing.

WordPerfect

From the powerhouse of word-processing programs comes the added feature of an integrated spelling checker. The WordPerfect program contains a dictionary with more than 50,000 words and the option of adding more. You can create your own dictionaries if you have two disk drives.

The program gives you suggested spellings for words in your document it doesn't find in its dictionary, and you have the option of scrolling through the dictionary. Wild-card characters give you added leverage for word searches, and the program alerts you if you type in a misspelled replacement word. It also spots double-word typos.

The spelling checker is a worthwhile addition to the king of word-processing programs, and you can upgrade your copy of WordPerfect to add the spelling checker for only $30.

Cast a Spell

Spelling checkers add significantly to the advantages writers have already gained with word-processing programs. Although they are not a replacement for careful proofreading, if you're willing to spend the time required to run your documents through a spelling checker, you can be sure you'll get a much higher degree of accuracy in your work. ✚

Susan Janus, a frequent contributor to A+, is a free-lance writer working in the San Francisco Bay Area.

larly, contractions can be bypassed or changed into more formal English. Sensible Grammar also recognizes and corrects word groups that should be written as single words (e.g., *every thing*, *can not*) and vice versa (e.g., *alot* should be *a lot*).

The last feature is a wordy-phrase checker with a list of over a thousand awkward phrases and their alternatives, and although Sensible Grammar cannot detect disjointed thinking, the faulty phrases and superfluous words it identifies are often associated with such thinking. Replacing these phrases may clear up enough of a sentence's meaning to make additional editing simpler.

Disadvantages

Despite Sensible Grammar's capabilities, some people will find the program too limited. It cannot find misplaced words, poor sentence structure, or verbs in the wrong tense—each one of which is a violation of good grammar. A document you proofread with Sensible Grammar will still require careful reading before you can consider it error-free.

To use Sensible Grammar with a word-processing program, you must save your document as a text file, print out the corrections, and then enter each change individually with your word-processing program.

Sensible Grammar comes on a protected disk, thus leaving users dependent on Sensible Software for backups. Sensible Software has plans, however, to provide a flow of updates. The manual is simple and well written—it keeps its promise of having you running the program in 15 minutes.

Individuals who have few problems with their writing or who are effective proofreaders will have little need for Sensible Grammar. If you are among the remaining majority, though, Sensible Grammar may be a useful tool for you.

John Heroy

PRODUCT INFORMATION

Sensible Grammar
Sensible Software
210 South Woodward
Suite 229
Birmingham, MI 48011
(313) 258-5566

List Price: $99.99 (includes manual and 5¼- and 3.5-inch disks)

Requires: Apple IIe with an Extended 80-Column Card, or Apple IIc; monitor capable of displaying 80-column text; Disk II, DuoDisk, UniDisk, or UniDisk 3.5 disk drive

Works With: AppleWorks, Apple Writer, MouseWord, and—with some limitations—Formatt II ProDOS, PFS:Write ProDOS, Zardax, MouseWrite, and Word Perfect; all ProDOS hard-disk drives and most RAMdisk drives

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They are made by top USA makers, and should not be confused with low-ends or seconds. Since we are one of the largest disk buyers in the world, the manufacturers give us their best prices! In our agreements with the manufacturers, we can't reveal their names, but when you receive them you'll recognize these as among the highest-quality disks made!

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#PR470 Epson MX80/RX80/FX80; Commodore 4022/8022; $4.50ea 12/$49.50
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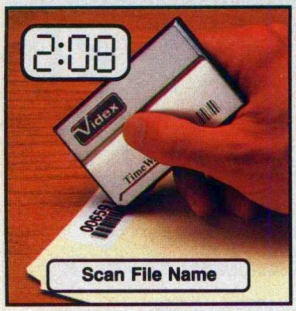

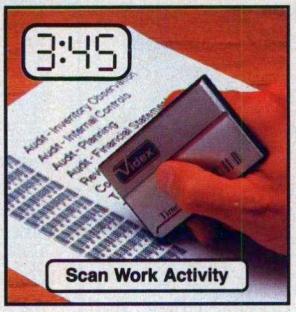

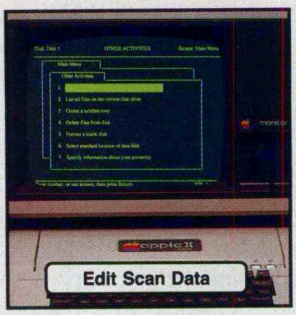

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As its name implies, TimeWand does more than just read bar codes, it also time-stamps each bar code as it is read. This powerful feature allows you to use the TimeWand to streamline a variety of applications such as asset control, material tracking, client billing, and maintenance control to name just a few. TimeWand is a versatile tool that can help you collect and process a wide range of business information.

TimeWand Communication Software

The Apple // Communication program performs many of the basic software tasks needed for working with the TimeWand. It transfers the bar codes out of the wand and stores them to disk, reformats the data on disk so that you can use AppleWorks to create reports, and programs the wand to read different types of bar codes. The Communication program requires an Apple //+, //e, or //c with a minimum of 64K of memory and a ProDOS compatible clock.

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AppleWorks Modify Plus $59

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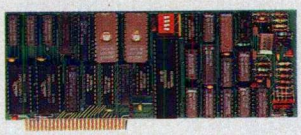

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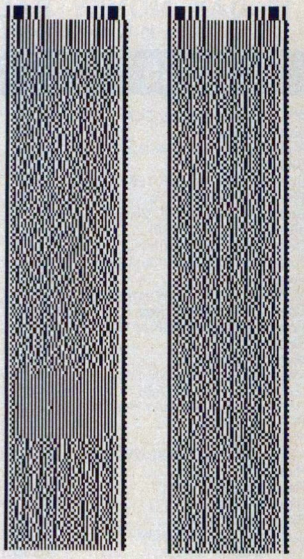

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Conversion Program

READTHIS.TXT
INSTRUCTIONS

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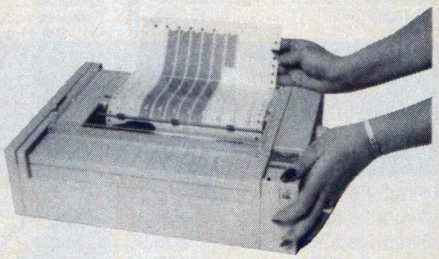

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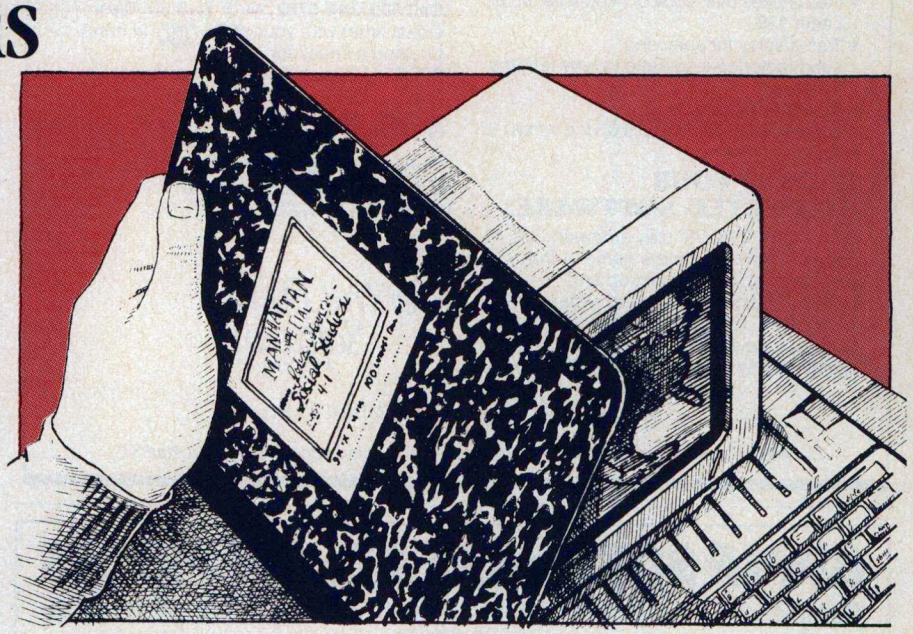
CIRCLE 137 ON READER SERVICE CARD

BY DAVID D. THORNBURG

A CONSTRUCTION SET FOR TEACHERS

Tutor-Tech makes creating instructional software fast and easy.



This January I came across a new "construction set" authoring system for the Apple IIe and IIc computers that deserves a close look by teachers interested in creating instructional software. This product is Tutor-Tech from Techware, Inc.

Tutor-Tech consists of a teacher's disk for creating lessons, a student disk for running them, and an optional grader disk for performing statistical analysis and creating grade reports from data captured automatically during lesson use. These three components are priced separately to allow purchases to be tailored to each classroom's specific needs.

Lessons you create with Tutor-Tech are organized around screens or "pages." Each lesson can contain graphic information as well as text. You ask students questions that they answer by "clicking" buttons (for multiple-choice responses) or by entering text from the keyboard.

Whenever a student clicks a button, the program jumps to a new screen that the teacher has previously chosen to be the destination for that button. Typed responses are analyzed to see if they match a predefined answer. The program then branches to one of two screens, depending on whether or not the student's answer was correct.

This ability to branch quickly through many pages of a lesson makes lesson construction easy. It does require advance lesson planning, however, so the teacher knows which page is the correct destination for each button click.

The Tutor-Tech buttons can do more than direct the program to a new screen. Three button types are available: neutral, plus, and minus. When a student clicks a neutral button, the only thing that happens is that a new page appears. A click on a plus or minus button increases or decreases the student's score by one point and causes a jump to a new page. The score for each lesson accumulates automatically, and students can't tell the "value" of a button.

Tutor-Tech's main contribution is that it allows teachers to concentrate purely on the lesson itself.

The Authoring Situation

Lesson creation with Tutor-Tech has two stages. The first entails the creation of a storyboard with pencil and paper showing, roughly, what will be on each screen and what should happen when each button is clicked.

Individual lessons can contain 250 pages, assuming you don't run out of memory first. You can build larger lessons from smaller ones by linking them together. This method solves any RAM-space problems that might otherwise occur.

To keep memory requirements to a minimum, Tutor-Tech pictures are built from graphic objects rather than from bit maps. This style of graphics (also found in MacDraw and Filevision, for example) allows the representation of complex pictures in little memory space.

Another Maclike aspect of this product is its use of pull-down menus and the mouse. (The mouse is necessary only for use with the teacher's disk—students can use cursor-control keys instead). The similarity to the Macintosh interface is so close that I was able to use this product within a few minutes of opening the package. Unfortunately, the lower resolution of

ILLUSTRATION BY JIM CERIBELLO

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CIRCLE 256 ON READER SERVICE CARD

the Apple II screen keeps the result from being as nice as a Mac image.

I built a simple ten-screen lesson about the solar system with this product. I created and tested the entire lesson in less than 30 minutes (mostly because I didn't worry about the quality of my artwork). I could never have created software this quickly with a traditional programming language.

Filevision Comparison

I couldn't help but think of Filevision while working with Tutor-Tech. The solar-system lesson was one I had also created with Filevision last year, using a feature that lets you link multiple Filevision screens together. The major difference between the two programs (other than their hardware) is that Filevision does not allow automatic scoring and that Tutor-Tech lacks highlighting and database features.

Editing is much easier with Macintosh-based products such as MacDraw and Filevision than it is with the Tutor-Tech program. I wish this program had an optional alignment grid, for example.

You can't relocate a Tutor-Tech graphic once you've drawn it on the screen. On the other hand, a sequential Undo feature lets you take a picture apart, piece by piece, until the screen is blank. If you place an object in the wrong location, you can erase it and add a new one without disturbing any other parts of the screen—not a bad trade-off.

Tutor-Tech's main contribution is that it allows teachers to concentrate purely on the lesson itself, without having to worry about the mechanics of programming, which is what the creation of computer-assisted lessons should be about! +

David Thornburg is the creator of Calliope, a nonlinear idea processor for the Apple II, IIc, and Macintosh computers. He enjoys hearing from readers and can be reached in care of this magazine.

PRODUCT INFORMATION

Tutor-Tech
Techware, Inc.
P.O. Box 1085
Altamonte Springs, FL 32715
Written inquiries only
List Price: teacher's disk, $195; student disk, $5; grader disk, $195
Requires: Apple IIe or IIc

CIRCLE 351 ON READER SERVICE CARD

BY MICHAEL WIESENBERG

THE ABSENTMINDED CLERK STRIKES AGAIN

More misplaced multiplying makes mischief.

Grey Scrivener, technical-writing specialist, watches an energetic volleyball game from the shade of a eucalyptus tree. Other members of the I-Q Industries languages lab play in the game. Sally McRae, ace programmer, in torn cutoffs and a Gelato Classico T-shirt, leaps for a wild ball served by the opposing team captained by Spotswood Gilbert. Bob Levin, IQ FORTRAN 8X front-end specialist, resplendent in zebra-striped polo shirt, pink bermudas, and fluorescent yellow Nikes, blocks the ball at the net. Marian Smith grinds out a cigarette beneath her heel before joining Scrivener at his observation spot.

The I-Q summer picnic takes place in the sunbaked hills of the Santa Cruz, adjacent to a large state park, on privately owned I-Q land. Each I-Q division reserves the site for a summer weekend.

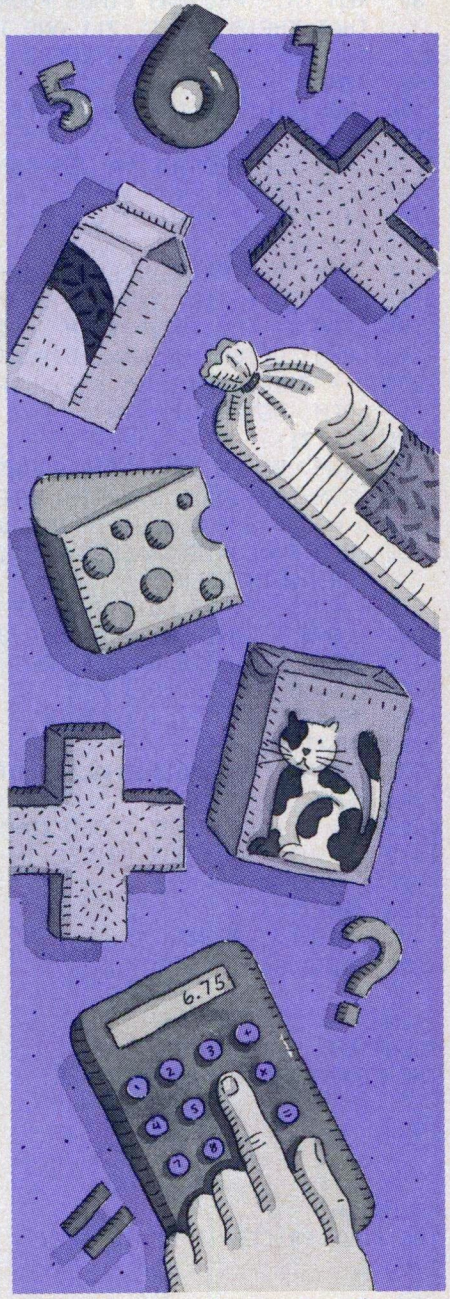
Booths with games for the children and lots of prizes dot the site. The barbecue lunch, served by I-Q volunteers, is free, as are fruit-juice concoctions poured over crushed ice.

After the game, the five friends share lunch at a picnic table.

Scrivener warily eyes a cola in which swim two bees, while several more circle his cob of corn. "This place is perfect, except for the bees. I'm allergic to bee stings."

Gilbert gently brushes a small creature from his steak. "Pay no attention to them. Just don't appear threatening, and they won't bother you."

Levin douses a hot dog liberally with mustard, ketchup, and relish. "Anybody work out the card-matching problem we discussed yet?"



Smith slides to the end of the bench to light a cigarette. In the open she won't offend anyone. "I'm still working on the coincidental mathematician."

Levin looks puzzled. "'Coincidental mathematician'?"

"Yeah. Every time he goes into a store, just by coincidence, the clerk screws up his purchase in such a way as to pose a unique mathematical puzzle."

"Oh. Well, here's another coincidence, then. And now that you know how to approach this sort of puzzle, it should be easier. Some mathematician buys four items of four different prices from the same absentminded clerk, who enters them on his desk calculator, again pressing the multiplication key instead of the addition key, coming up this time with $6.75. Naturally, since this product is the same as the total would have been by adding, the mathematician says nothing, merely storing the situation away in his mind to pose to his students later. What are the prices? And how quickly can your program produce them?"

The Challenge

We're looking for a complete program that produces the four prices and shows that they are unique, if indeed they are.

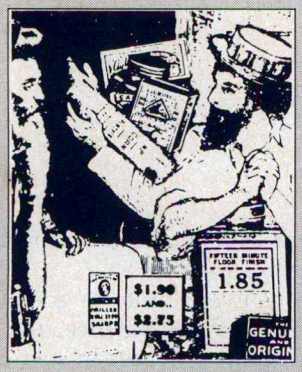
Your program must be short, elegant, and self-documenting. The best, fastest-executing solution will win a one-year subscription (or extension) to *A+* and a Certificate of Excellence in Programming and will be published here.

Please send all entries, which must be received by July 8, 1986, to Computer Calisthenics, Box 2329, Stanford, CA 94305. If you want us to return your entry, enclose a self-addressed, stamped envelope or diskette mailer. All entries become the property of the author. The winner will be selected by the author, whose decision will be final. The winning program will be announced in an upcoming issue of *A+*.

ILLUSTRATION BY MARY LYNN BLASUTTA

COMPUTER CALISTHENICS

M A R C H 'S WINNER



Jeffrey Zarkin

About a fourth of the entrants claimed there was no solution to the March puzzle. To them I say add and then multiply these numbers: 1.20, 1.25, 1.50, 3.16. Where these folks went wrong was in using real numbers instead of integers. (By the way, phoning the *A+* office to press your claims won't do you much good, since I'm hardly ever there.)

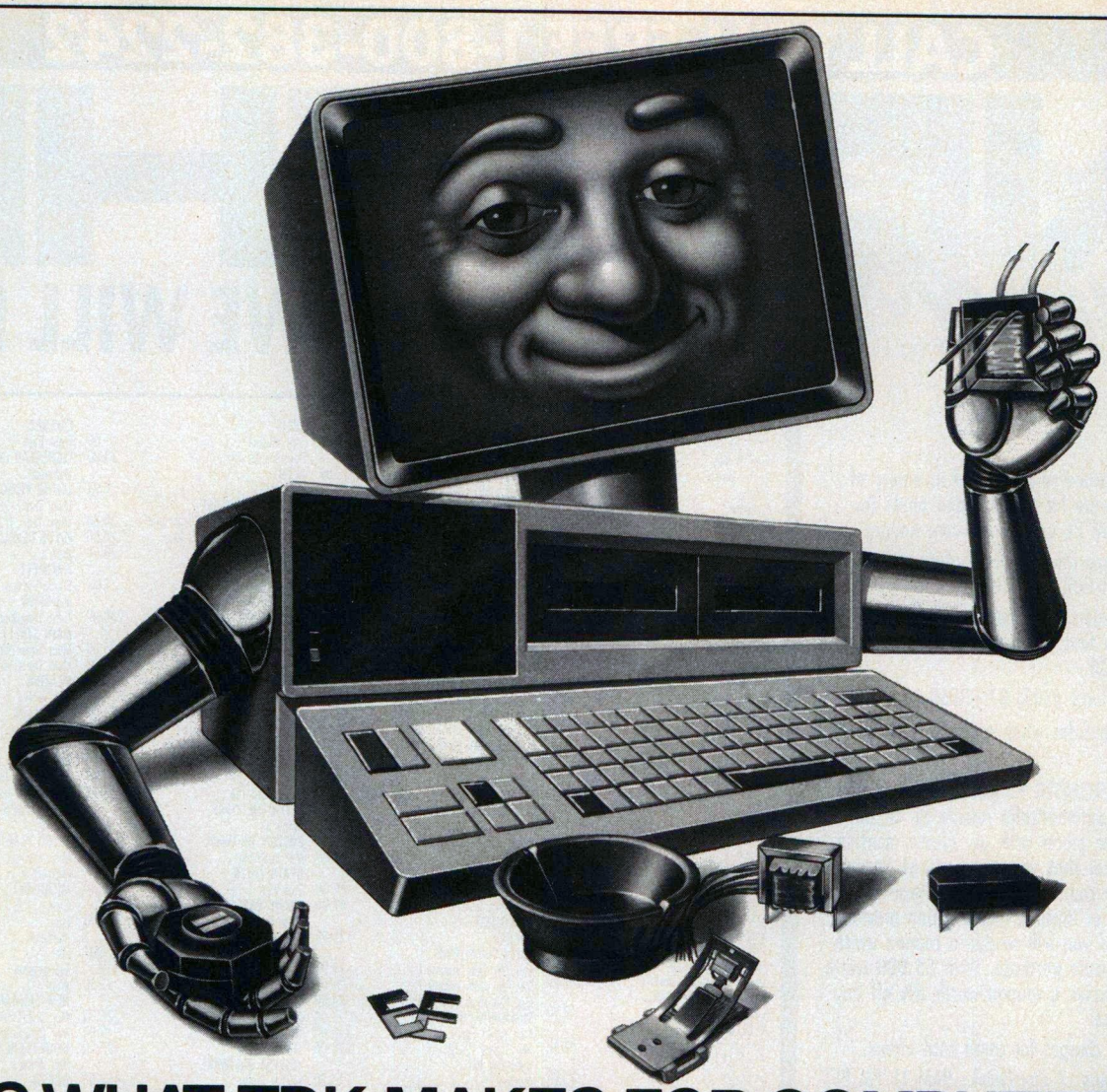
Another fourth came up with solutions such as 2.41, 1.15, 2.54, and 1.01, which produces 7.1100061. Close, but surely the clerk would have noticed when his desk calculator came up with a total with more than two decimal places.

Programs that solved the puzzle ran from as long as eight hours to just under one second, that from Jeffrey Zarkin of East Lyme, Connecticut, the March winner. He examined only multiples of the prime factors of 711,000,000 (79,5,5,5,5,5,5,3,3,2,2,2,2,2,2). He specified one number, Z, a multiple of 79 less than 9 (since $79 \times 9 = 711$) and not equal to 7 (that not being a prime factor) in lines 120–150. Five being a prime factor six times meant that one other number must be a multiple of 25, less than 711–Z, and a multiple of the primes. In other words, 711,000,000 divided by $Z \times Y$ produces an integer (160–200). With Z and Y determined, two simultaneous equations must be solved: $X \times Y = 711000000/Y \times Z$ and $X + Y = 711-(Y + Z)$, which merge into one quadratic equation, $X \times X-S \times X + Q = 0$. After finding an acceptable solution, the program returns to search all possible solutions, finding two (which are the same with a different order).

The cleverness of the programmer, rather than of the program, reduced a search of hundreds of billions of possibilities to 104, which is how it could run so fast.

Phil Noble, of Weed, California, gets an honorable mention for the most improved program. His first program took more than 52 minutes. He followed with a second entry that ran in 27 seconds. +

```
]PRINT CHR$(27)CHR$(33)

]LIST

 10  REM  ADDITION=MULTIPLICATION
 20  REM       PROGRAMMED BY
 30  REM     JEFFREY A. ZARKIN
 80  REM THIS PROGRAM FINDS FOUR VALUES W,X,Y AND Z SUCH
     THAT THEIR SUM IS 711 AND THEIR PRODUCT IS 711,000,000.
     ALL ARE POSITIVE INTEGERS
 90  REM
 100  REM  INITIALIZE CONSTANTS
 110 N = 0
 120  REM  DETEREMINE VALUES FOR ZZ,Z
 130  FOR ZZ = 8 TO 1 STEP  - 1
 140  IF ZZ = 7 THEN ZZ = 6
 150 Z = 79 * ZZ
 160  REM  DETERMINE VALUES FOR YY,Y
 170 YY = 25 *  INT ((711 - Z) / 25)
 180  FOR Y = YY TO 25 STEP  - 25
 190  REM  DETERMINE W*X. DISCARD NONINTEGER RESULTS
 200 Q = 711000000 / (Y * Z): IF Q -  INT (Q) > 0 GOTO 310
 210  REM  DETERMINE X+W
 220 S = 711 - (Z + Y)
 230  REM  SOLVE QUADRATIC EQUATION
 240  REM  EVALUATE DISCRIMINATE
 250 D = S * S - 4 * Q: IF D < 0 GOTO 310
 260  REM EVALUATE SMALLER ROOT, DISCARD IF NEGATIVE
      OR NONINTEGER
 270 W = (S -  SQR (D)) / 2: IF W <  = 0 GOTO 310
 280  IF W -  INT (W) > 0 GOTO 310
 290  REM  EVALUATE LARGER ROOT, DISCARD IF NONINTEGER
 300 X = (S +  SQR (D)) / 2: IF X -  INT (X) = 0 THEN 400
 310  NEXT Y
 320  NEXT ZZ
 330  PRINT "NO ADDITIONAL SOLUTIONS EXIST-PROGRAM TERMINATED"
 340  END
 400 N = N + 1: PRINT "SOLUTION",N
 410  PRINT "THE FOUR PRICES-IN CENTS-ARE:"
 420  PRINT W,X
 430  PRINT Y,Z
 440  PRINT : PRINT
 450  GOTO 310

]RUN
SOLUTION               1
THE FOUR PRICES-IN CENTS-ARE:
120                 125
150                 316


SOLUTION               2
THE FOUR PRICES-IN CENTS-ARE:
120                 150
125                 316


NO ADDITIONAL SOLUTIONS EXIST-PROGRAM TERMINATED

]
```



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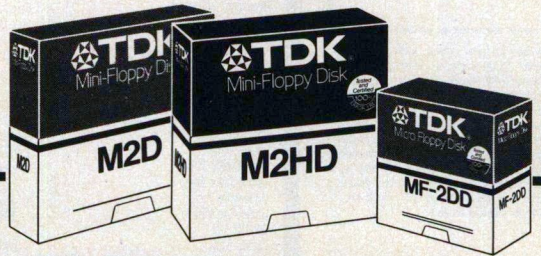

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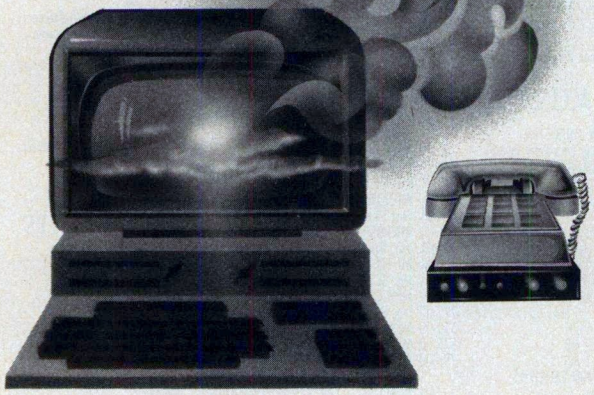

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CARRIERS AT WAR
ESSEX
STAR TREK: THE KOBAYASHI ALTERNATIVE
KING'S QUEST II

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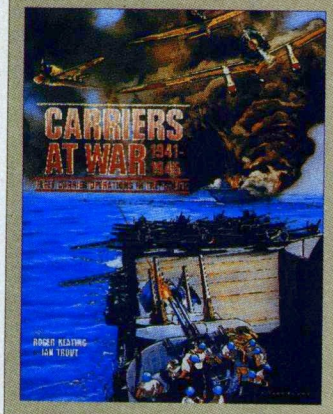


PACIFIC BATTLES REVISITED

Command the Japanese Task Forces attacking Pearl Harbor. Be an admiral at Midway or Coral Sea, or be a general commanding the 5th Air Force. These are only some of the possibilities with the solitaire-to-multiplayer Carriers at War, 1941–1945.

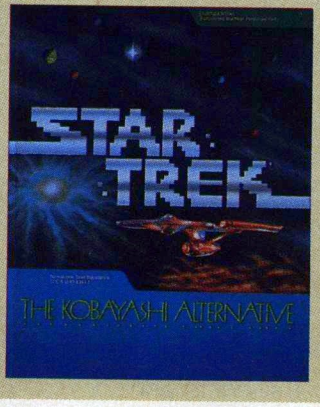
This war game simulates the air and naval battles fought in the Pacific during World War II. The game's scenarios allow players to recreate the historical battles of Pearl Harbor, Coral Sea, Midway, Eastern Solomons, Santa Cruz, and the Philippine Sea.

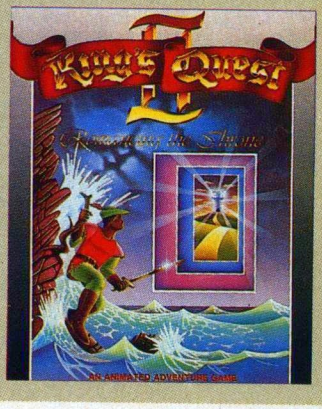
Carriers at War handles the complexity of the subject matter with a style that makes playing the game enjoyable; easy; and, most important, fast-moving. The game is structured around a menu system, and you control all operations at the keyboard. The total of 30 menus may sound forbidding, but practice soon helps you overcome any confusion.

Carriers at War's Introductory Scenario introduces the game's system, using the Pearl Harbor scenario. In its presentation of this solitaire scenario, the manual guides you step by step, menu by menu through the first phase of the Japanese sneak attack on Pearl Harbor, familiarizing you with the various menu screens and their interaction.

Many games of this type have players manually control the search phase, seeking the enemy fleet. Carriers at War, on the other hand, does this time-consuming chore automatically on every turn. Since the documentation does not point out this feature, players who are used to the manual search method may be confused. Aside from this minor point, however, players control all the other aspects such as task-force speed, heading, mission, CAP, and readying aircraft and aircraft strike missions.

An extraordinary feature of Carriers at War is its Game Design Option, a unique utility that allows players to create their own historical or hypothetical scenarios from 1900 to





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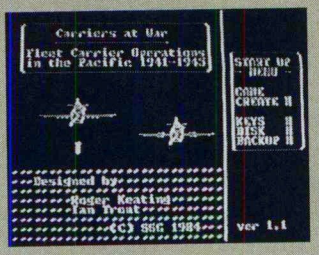

1955. Players can enter the hypothetical Raid on Ceylon scenario from the Game Design Manual to learn the ropes. The possibility of future scenario additions increases the variety and challenge of an excellent game system.

Carriers at War deserves commendation for its historical accuracy, enjoyment, playability, and expandability. It is destined to be a classic for novice and veteran strategists alike.

Richard L. Mataka

Carriers at War
Strategic Studies Group
Distributed by:
Electronic Arts
1820 Gateway Drive
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List Price: $49.95
Requires: Apple II, II Plus, IIe, or IIc; 64K RAM
CIRCLE READER SERVICE NO. **358**

ON THE TRAIL OF MALODOROUS MUTANTS

Like a recurring nightmare, the Vollchons, a race of alien monsters as ruthless, murderous, and ugly as aliens come, are attacking the peace-loving Federation again. Previously beaten in the Arcadus War, these malodorous mutants and their battle-machine destroyers have already conquered the Sirius sector.

Worse, Professor Ignatz Klein, the only scientist with the knowledge to defeat the Vollchons, has crash-landed on a remote planet and is presumed dead. Furthermore, the only ship close enough to do anything is the Essex, an independent starship commanded by the misanthropic Captain Dee.

Essex, the second in a series of "Electronic Novels" published by Synapse/Brøderbund, is a text-only science-fiction adventure game. It weaves a tale around a search-and-rescue-and-save-the-universe scenario. Unlike most text adventure games, which let you plug in the disk and start right away, Essex requires you to read several short chapters in a hardbound book. They set the scene, prepare you for the adventure, and provide clues.

You wander within the framework of the story, interacting with other characters, exploring strange new worlds, and solving puzzles.

As the hero, you wander within the framework of the story, interacting with other characters, exploring strange new worlds, and solving puzzles. The parser structure, which recognizes "over 1200 words," does a commendable job of translating your intentions into game action. Certain quirks, such as the inabil-

What every Apple II+ and IIe user should ask before buying the "Sider" 10 MB hard disk:

When a company offers a superior quality 10 megabyte Winchester hard disk for only $695, it's bound to raise a few eyebrows...and a lot of questions. The fact is, you're probably already wondering "Can I really get a 10 megabyte hard disk that's *reliable* for only $695?" The answer is: ABSOLUTELY...when you choose the Sider from First Class Peripherals.

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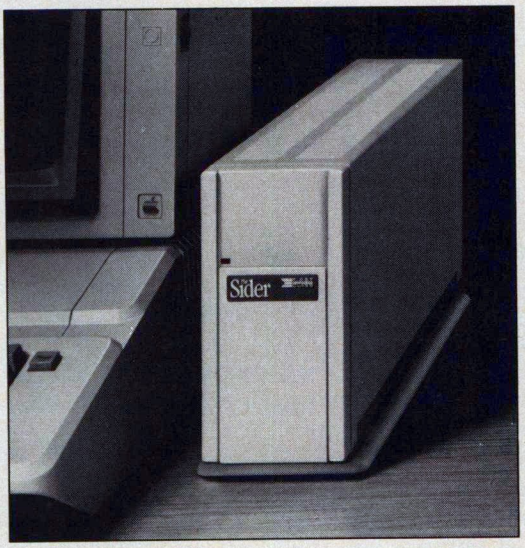
Special design features further enhance reliability. The Sider's controller is the field-proven, industry standard Xebec S1410A. And Xebec's 3200 drive tester, the toughest in the industry, ensures that the Sider will operate reliably. One more assurance of the $695 Sider's quality: it's UL Approved and FCC Class B rated.



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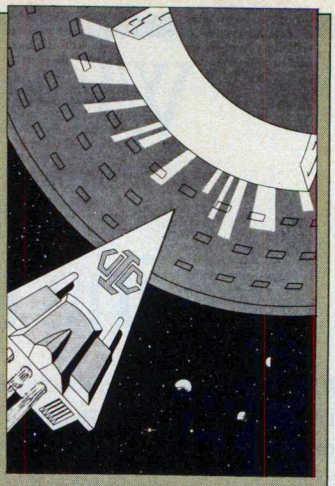

ity to drag bodies around and the failure to follow a guy (perhaps Dee) who walks right by you, make me wonder, though. Another example, "push Fred out of the Turbolift," translates as *press Fred* (like a button on a console). Maybe I was pressing Fred's belly button by mistake.

Essex was delayed beyond its original release date. Evidently, the program had a few problems. Not all of them seem to be fixed. For instance, after uncovering the Vollchon spy (on the bridge no less), I knocked him out and then hit him again. The program informed me, "The spy lies here out of commission."

"I'm going to kill you," the spy says calmly. Before I could type a character, the poison-fanged spy bit me. Nothing like a surprise to shake up a cruise.

Nevertheless, the prose proves to be well written and fairly descriptive. The interplay between you and a tour group is entertaining and enlightening (at least the first few times you play). You should pay attention to the ceaseless chatter. Some of the offhand comments conceal clues. Another good idea is to question each member of the tour group about the other tour members.

Essex is a good adventure game but not a great one. Although portions of it stimulate your imagination, often you find yourself wandering aimlessly. The pace of your achievements, at least compared to their speed in Mindwheel and Brimstone (the first and third Electronic Novels from Synapse/Brøderbund), is slow. Die-hard science-fiction gamers might find Essex interesting. In fact, I would go so far as to liken it to a B-grade cult movie. Most of you will probably want to pass it by, however, in favor of the excellent Mindwheel or Brimstone.

Russ Lockwood

Essex
Synapse/Brøderbund
17 Paul Drive
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(415) 479-1120
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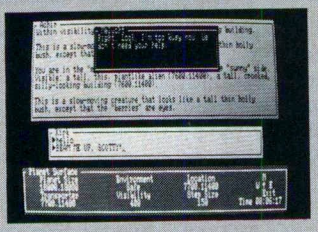
That's Entertainment

SHOW YOUR CELESTIAL METTLE

In *Star Trek II: The Wrath of Khan*, we finally and definitely learned how Admiral Kirk wins all the time. He cheats.

That's how he passed the Kobayashi Maru test, a test of character to see how would-be Starfleet officers would respond to an almost certainly fatal situation. The test has now been replaced by The Kobayashi Alternative, a Star Trek simulation from Simon and Schuster. Just like the simulation it replaces, its purpose is to test the mettle of those who would presume to sit in the captain's chair of a Starfleet vessel. In this simulation, you play the part of Admiral Kirk.



Your mission, Jim, is to find out what happened to the missing Federation ship *Heinlein* under the command of Acting Captain Lt. Sulu. The ship disappeared somewhere in the Trianguli region, and you have ten star systems to explore, each with its own host of planets, moons, and intelligent life forms, some of which may be hostile (others have never even seen a human being before). These are the races you have to interview to find out if they know what happened to the *Heinlein*.

Be careful, Jim, the Prime Directive is in full force here.

Now, here's the hard part. When you do find the lost ship, your job is to find out what its *very mysterious and highly classified* secret mission was and assist in its completion.

Got that? Good.

Unfortunately, dear Candidate, you will not be given the same opportunities to cheat as Admiral Kirk has had. You have to play this one as it is written. And it is written very well indeed.

Read the programmers' credits. In addition to a highly talented team of Federation Class Software Engineers, science-fiction writer Diane Duane—author of two Star Trek novels herself—helped design the essential story line. It makes for a high level of accuracy, playability, and imagination.

The Kobayashi Alternative is an all-text adventure, with a powerful difference. The game is played in multiple windows, which update automatically. You have ten function keys for giving, taking, examining, etc. What you type is what your character actually says. Major Star Trek characters—McCoy, Spock, Scotty, Uhura—have their own personality databases to recreate their distinctive characters in the game.

The first thing you're going to have to do here is *read the manual*. You can't learn this game easily by just getting into it and

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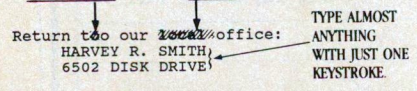

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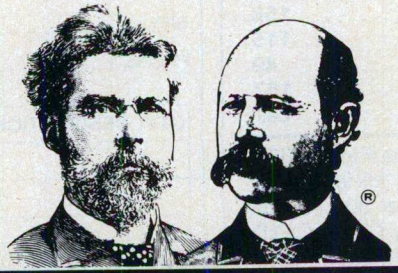

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1	ADDRESS
1	ADDRESSES
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1	ALMOST
1	ALWAYS

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1	WRITING
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1	YOU'VE
8	YOUR

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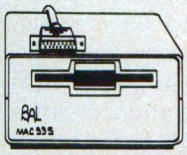

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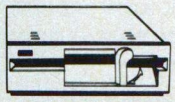

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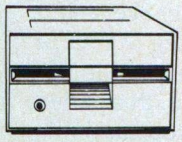

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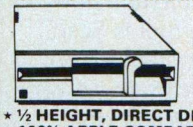

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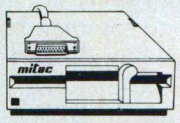

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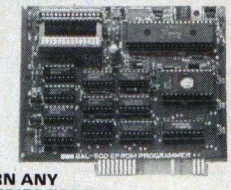

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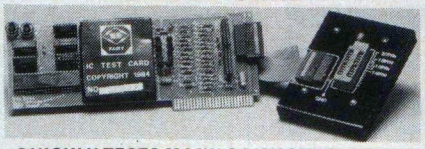

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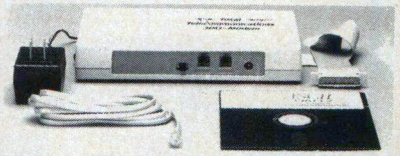

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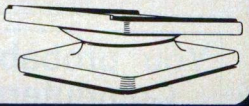

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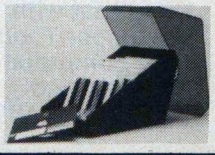

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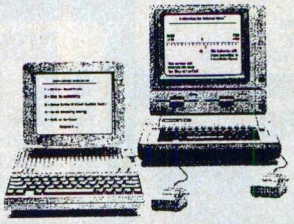

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The user manual is easy to understand and is packed with money saving U-DO-IT information. The Drive Analyzer tests and calibration routines alone will pay for Master Diagnostics after using it just once.

Expert Opinions

Nibble magazine says, "This program should be in the library of every Apple user". Howard Sams Tech Manual, Apple Orchard, In-Cider, Popular Computing, and the Apple II Review have all awarded Master Diagnostics with triple AAA ratings. *Consumers Guide chose Master Diagnostics as one of the best programs for 1985.*

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CIRCLE 329 ON READER SERVICE CARD

That's Entertainment

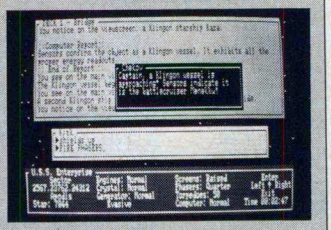
hacking around. Fortunately, you get a card of the most common commands to put next to your keyboard. It all takes a little bit of getting used to, but it's worth the effort; once you get the hang of it, it's practically addictive.

The good news here is that you have all the facilities of the *Enterprise* at your disposal: transporters; communicators; tricorders; phasers; computers; and, of course, the ever-popular photon torpedoes. The turbolift can take you to any part of the ship, although you'll probably have to draw yourself a map.

The bad news is that there are a lot of ways to die in The Kobayashi Alternative. In the original "Star Trek" episodes, there was never any doubt who was going to live and who was going to die. For instance, if Kirk, Spock, McCoy, and Crewman Newman (who we've never seen in any other episode before) were all to beam down to the surface of a strange alien planet, it was no secret at all who was going to be eaten by the Great Ghastly Green Globber—and usually before the first commercial.

No, it was never Kirk, Spock, or McCoy who got an on-site inspection of the Ghastly Green Globber's alimentary canal. Or, if one of them somehow had the bad luck to die in the middle of the show, the others found a way to resurrect him before the final fadeout—or at least in the next movie.

Unfortunately for the Officer Candidates playing The Kobayashi Alternative, this simulation is not as forgiving. Here,



when Kirk makes a mistake, it's Kirk who dies.

Blessed be the programmers—there are all kinds of great ways to die, such as beaming into the center of a mountain. And in this simulation, death is for keeps. There are no convenient reincarnations, resurrections, or friendly alien supergods to put you back together and into the game so you can keep on going.

The disk won't self-destruct, though, so you do get an unlimited number of second chances—if you're willing to start at the beginning again. If nothing else, this game will teach you caution!

Two commands are most valuable to a new player. The first is Scan. You cannot possibly do too much scanning. Every piece of information is valuable—if not for winning the game, then certainly for your survival.

The second command you already know. It goes like this (in unison now): "Scotty! *BEAM US UP!*"

David Gerrold

STAR TREK: The Kobayashi Alternative
Simon & Schuster, Inc.
Simon & Schuster Building
1230 Avenue of the Americas
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(212) 245-6400
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Requires: Apple II, II Plus, IIe, or IIc; 64K RAM

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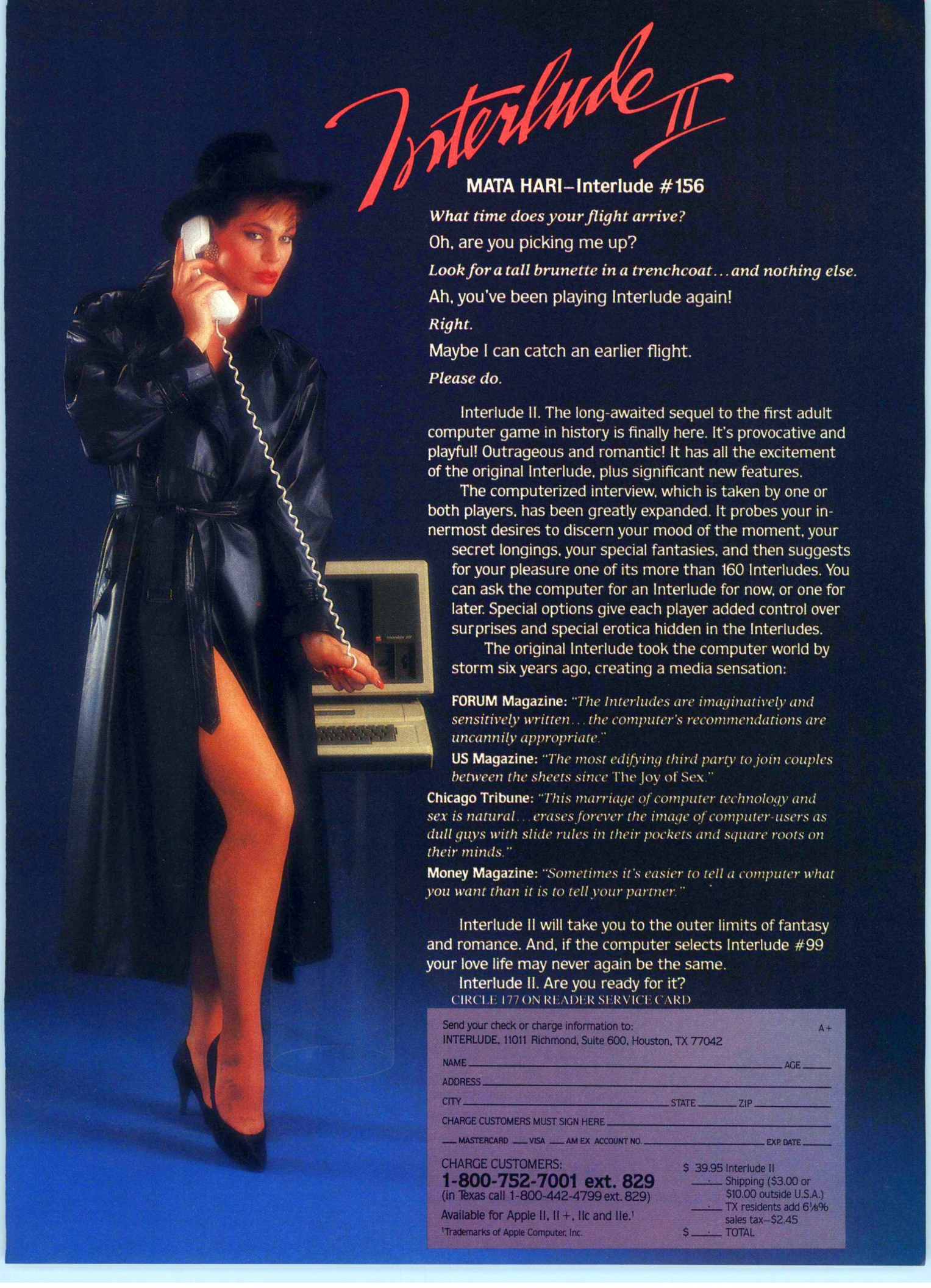
Interlude II
MATA HARI–Interlude #156
What time does your flight arrive?
Oh, are you picking me up?
Look for a tall brunette in a trenchcoat...and nothing else.
Ah, you've been playing Interlude again!
Right.
Maybe I can catch an earlier flight.
Please do.
Interlude II. The long-awaited sequel to the first adult computer game in history is finally here. It's provocative and playful! Outrageous and romantic! It has all the excitement of the original Interlude, plus significant new features.
The computerized interview, which is taken by one or both players, has been greatly expanded. It probes your innermost desires to discern your mood of the moment, your secret longings, your special fantasies, and then suggests for your pleasure one of its more than 160 Interludes. You can ask the computer for an Interlude for now, or one for later. Special options give each player added control over surprises and special erotica hidden in the Interludes.
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FORUM Magazine: "The Interludes are imaginatively and sensitively written... the computer's recommendations are uncannily appropriate."
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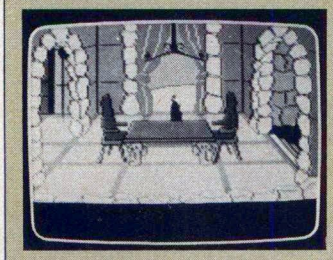
That's Entertainment

HERE YE, THERE YE

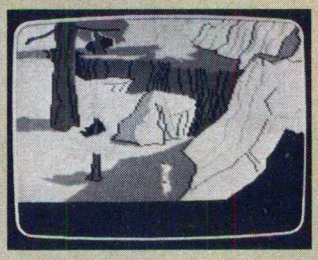
This time the castle rumors were as trustworthy as the world almanac! Just as I'd heard, there now really is a sequel to my best-selling, award-winning, first starring vehicle, King's Quest. In days of yore, a king's exploits were



glorified in folk stories and ballad-songs, but since this is 1986, my doings have been recorded in animated graphic adventure games. I think that's a heck of a lot more fun than all that "And then it came to pass" stuff. I wouldn't entrust the rights to tell my story to just anybody, though. Nosirree-bob. I picked Sierra On-Line, pioneers of the graphic-adventure-game format.

Oh, sorry, I'm so excited about this new game that I almost forgot to introduce myself. I'm King Graham. I used to be Sir Graham, and, as you may already know, the original King's Quest recounts how I got to be King of Daventry.

Well, let me tell you, it's hard work being King—and lonely, too. Even kings need companionship. So one day, I happened to glance into the magic mirror in my throne room, and what did I see staring back at me? A vision of such loveliness, such exquisite perfection of form and face that I fell helplessly, hopelessly, and



maddeningly in love. No, I didn't see *myself* in the mirror—it was the face of the fair maiden Valanice, from the kingdom of Kolyma. I knew instantly that I had to make her my Queen. But how? The wicked, jealous old crone Hagatha has imprisoned Valanice in a quartz tower in an enchanted land, guarded by a ferocious King-eating beast!

I had heard of this enchanted land, but to get there I had to find three special golden keys. So I traveled far and wide throughout Kolyma looking for them, exploring the caves, castles, and underwater wonderlands of that faraway kingdom. I had to watch out for the evil Enchanter, stay clear of the

It's hard work being King—and lonely, too. Even kings need companionship.

pesky Dwarf, and avoid the clutches of the big, bad wolf. I even had to out-

Here's How to Screen Your Grammatical Errors

Sensible Grammar saves you embarrassment and improves your credibility by helping you screen out the grammatical errors in your papers. And it's easy to use on your Apple II computer because it is AppleMouse compatible and has Macintosh-like screens.

Possible mistakes are shown to you in context, a replacement word or phrase is suggested, and you are then given the option to accept or reject the suggested correction.

Sensible Grammar does much more than catch bad grammar. It also...

- checks your capitalization and punctuation, as well as the spelling of abbreviations;
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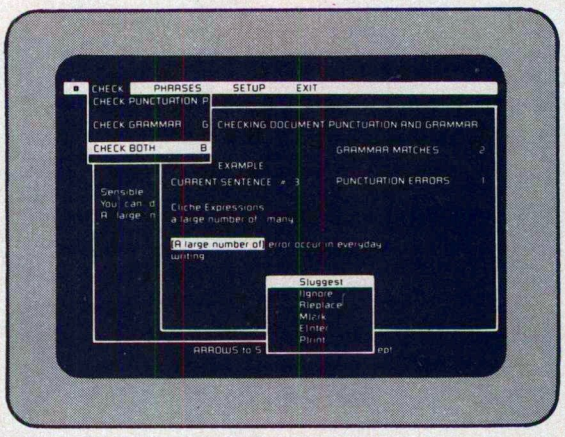

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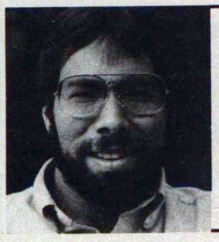

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That's Entertainment

smart old Hagatha herself; lucky for me she's hard of hearing. Oh, and that other guy—you know the one I mean, that awful pain in the neck—I had to deal with him too. *Twice*. No problem for me, since I had the right stuff. When he first saw me, he went batty. Cross my heart, that's what happened. And then in our second encounter, I fixed his wagon so that he'll never bother anyone ever again. I'll stake my reputation on that.

Other than the one I just mentioned, the rest of my obstacles weren't that difficult—especially because I was aided by a luscious mermaid, a devout monk, and several loquacious members of the animal kingdom.

You'll definitely have a blast helping me relive my quest. The programmers at Sierra On-Line did a top-notch job of perfectly capturing the beauty of Kolyma's 90 or so locations. Many of the screens are animated: Flags wave in the breeze; flames flicker and burn; waves lap the shore; and, at your command, doors and treasure-filled chests open and close. And there're lots of nifty surprises on the three-disk, five-sided game that I won't spoil by giving away in advance. I will casually add, however, that when you see what happens when I finally find Valanice, I hope you don't blush easily!

You can control my likeness by using either the joystick or the keyboard, but you'll have to use the latter for all the text input. And just as in the original KQ, you can make me walk all the way around trees and buildings, and I still do a mean breaststroke. And, to top things off, there are still those generous 26 save-game positions!

The King's nemeses include a big, bad wolf, a pesky dwarf, and the evil Enchanter.

So please, everybody, you just have to go out and buy KQII. Since you need 128K to play it, now is the time to upgrade, if your machine isn't capable. And if KQII is as successful as it deserves to be, who knows where I might go from here?

King Graham (Donald Oliver)

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BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

GRAPHICS PROGRAMS FOR KIDS

Rainbow Painter, Picture Writer, Color Me, and Designer's Pencil

Graphics programs are wonderful tools for introducing children (and adults) to computers, and a gaggle of Apple II graphics programs are intended for young people. This month, we look at four of them.

Rainbow Painter

This full-featured paint utility operates with a joystick or with the keyboard. The program opens with a colorful screen of icons (see figure 1). Click on Playground to draw on a blank screen, Mirrors to create kaleidoscope-type images, or any of the other ten icons to open "books" of predrawn black-and-white images for coloring.

Once you've made your selection, the "playground" appears, with icons at the bottom of the screen. Clicking on the rabbit in a hat opens a window of drawing options such as line, box, and so on. The crayon icon opens a box of 49 brushes to paint with, plus FILL (see figure 2). A paint-bucket icon lets you cycle through 99 colors and patterns, and the book icon pages through the four images in your selected coloring book.

Other icons allow you to edit patterns; undo your last move; access new picture libraries; and load, save, and print pictures.

Rainbow Painter offers as many options as most "adult" graphics programs do. It is a wonderful program for any child—up to the age of 90.

Picture Writer

Picture Writer, comparable to Penguin Software's Graphics Magician (see "The Graphics Magician," *A+*, May 1984, and "Seeing Double," *A+*, January 1985), records the steps you use in creating a graphic. The program then redraws the completed picture, step by step. You can store finished pictures as "process" pictures (in which the drawing steps are saved) or as standard 34-sector pictures.

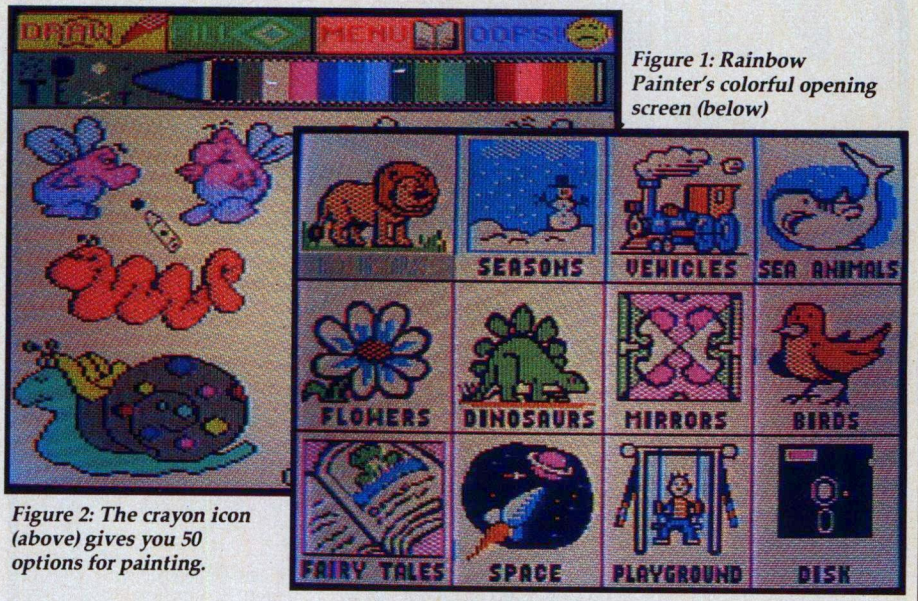

Figure 1: Rainbow Painter's colorful opening screen (below)

Figure 2: The crayon icon (above) gives you 50 options for painting.

Rainbow Painter is a wonderful program for any child—up to the age of 90.

As you draw with Picture Writer, you can compose music. Pressing M plays a note for most drawing steps. The higher the step is on the screen, the higher the note. In the Music mode, R redraws the picture with the music accompaniment. Young people can have fun drawing designs that play distinctive tunes.

Unfortunately, we can't recommend Picture Writer. The menu icons are too small, and the user interface is cumbersome. Instead of selecting an icon with the joystick, you must use the keyboard—e.g., C for color, then 5, and 5 again for solid blue. Five for blue? Apple colors have numbers: 1 is green, 6 is blue, and so on. Every graphics program we've seen adheres to this scheme. If they must use numbers to select colors, we'd want our children to learn Apple's numbers.

If you want to introduce children to step-by-step drawing, show them the professional's Graphics Magician—it may not have music, but it's easier to use than Picture Writer.

Color Me

With an enhanced Apple IIe or a IIc and a joystick, KoalaPad, or mouse, even very young children can

experience the joy of using red, yellow, and 14 other colors, with Color Me, a double-hi-res graphics program.

The palette, one of the cleverest we've seen, is displayed as a striped crayon. Selecting a colored stripe chooses the drawing color, and the tip of the crayon changes to that color. You use the crayon to draw, fill, and enter text. Other options include Undo, Magnify, Cut and Paste, and Print.

For a children's program, Color Me packs a surprising wallop: It includes two active graphics pages to allow easy cutting and pasting between different pictures. This feature, combined with supplemental Color Me picture disks, encourages kids to put together good-looking pictures.

Color Me's palette, one of the cleverest we've seen, is displayed as a striped crayon.

Color Me is a wonderful program for children (assuming the adults are finished playing with it).

Designer's Pencil

Designer's Pencil is a graphics programmer's toolkit, not a paint program. It features more than 30 commands that, when you put them in the right order and give them the correct parameters, produce a graphic. The program draws the pictures as you watch. The range and power of Designer's Pencil is impressive. It has commands to draw lines, arcs, and circles; fill; make kaleidoscopes; alter the speed of drawing; and so on. The program also includes simple music commands.

Like many programs that were originally created for Atari or Commodore computers, Designer's Pencil was designed to work with switch-style joysticks (up, down, left, right), rather than the Apple joystick's rheostat mechanism. Therefore, using an Apple joystick is awkward. If you don't have a joystick attached to your computer, you can use the keyboard, but if a joystick is attached, the program automatically accesses it. We would have preferred an option to select keyboard input, even if a joystick were connected.

The user interface is clumsy. The screen is divided into four major areas, and to move from one section of the screen to another, you must position your cursor correctly. For example, you must enter the master command area from the middle of the screen. To enter a command into the programming area, you select it from the rightmost window. Moving from window to window is distracting. Also, you don't see the results of your program until you enter the master command area and issue a RUN command—novices will have trouble conceptualizing the results of command arguments.

The programming language of Designer's Pencil includes variables, labels, GOTOs, and recursion. The instruction manual describes the language features, but we doubt that a child or a beginner could tap its power without a lot of work.

We like the idea of using graphics to teach programming, but such an effort might better be directed at learning BASIC or Instant Pascal; with these languages you can see the

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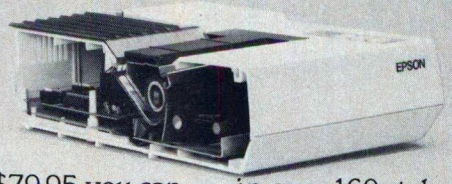

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results of an instruction immediately. With a better interface and an Immediate mode, Designer's Pencil could be a contender.

Encourage Creativity

We're delighted to see so many graphics programs for young people. Most of these programs provide pictures for coloring. Let your children and/or students use these to become comfortable with the computer and the software. Then, for maximum creative development, we hope you'll encourage them to use the drawing tools to create original images.

Coming Up

Next time we'll look at some excellent new products for your graphic excursions on the Mac, including PictureBase, PosterMaker, 4Paint, and PacPaint. +

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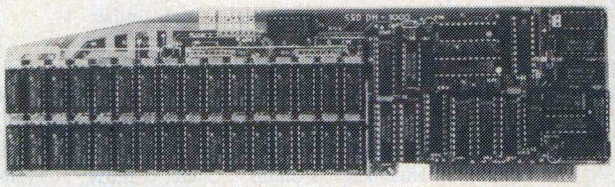

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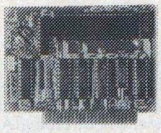

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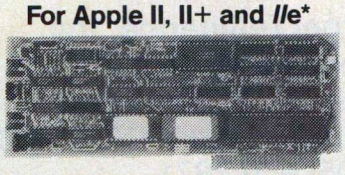

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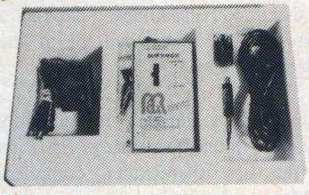

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Artificial Intelligence Update

Transform Your Macintosh Into A Powerful A.I. Workstation For Less Than $500 ... And Make It Fly ! *

In 1983, I was developing an expert system tool in LISP (the *defacto* standard). It was a shock when I encountered a true LISP workstation - both the price ($100,000) and its capability (phenomenal !!). I rushed out and bought one, and it immediately justified the expense. My code development speed increased 10 TIMES because of the incremental compiler, integrated editor, and rich environment. But I also wanted to deliver my completed application. In 1984 Apple answered my prayers by giving us the Mac!

This tool had a powerful 68000, windows, a mouse, menus; in short, all of the things I was used to on my LISP machine, **except LISP!** I realized that until I had a good LISP on the Mac, I was limited in what I could accomplish. With a team of skilled LISP programmers, we started to create a powerful development environment for the Mac, with an incremental native code compiler, macros, multiple edit windows, automatic matching parenthesis and indentation. Along the way we added control of the Mac toolbox, 3-D graphics with perspective, spherical graphics and an object oriented SmallTalk like class system. The result is an incredible environment that rivals features found ONLY on $100,000 systems, and is available today at microcomputer prices of less than $500.

Our next task was to port across expert system tools to the **ExperLisp** environment. With the help of Science Applications, the 3000+ lines of LISP source code in OPS5 was running in less than two weeks, and *outperformed* a $30,000 workstation. **ExperOPS5+** is now available with a user interface that includes dialog boxes and pictures for less than $500! Next was a another powerful expert system builder called **ExperFacts.** It can chain both *forwards and backwards.*

If all of this just seems too good to be true, just remember how far technology has come. The $100,000 system has 2MB of memory. Amazing! But not as amazing as the MacPlus; it has 1MB to 4MB of memory for 1/20 of the price!

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Denison Bollay,
Founder and President,
ExperTelligence, Inc.

ExperTelligence Takes the Lead in Lisp Workstations

SANTA BARBARA, Ca. - ExperTelligence announced today that it has sold more LISP compilers than any other A.I. vendor. Additionally, the company announced that its expert system shell **ExperOPS5** has been sold to more than 1000 customers. This is a larger installed base of users than all of the other A.I. vendors combined.

Headquartered in Santa Barbara, the publicly held company has pioneered many firsts in the industry: the first incremental compilers on the Mac (**ExperLogo** in '84, **ExperLisp** in '85); the first 3-D tools (with automatic perspective) and spherical graphics embedded in Lisp and Logo; the first complete expert system shell on a microcomputer (**ExperOPS5,** developed in **ExperLisp** by Science Applications International). Soon to be announced the first **CommonLisp** compiler for the Mac.

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MARSEILLES, France - PrologIA announced that it has chosen ExperTelligence, Inc. to distribute its famous PrologII in the U.S. Prolog was invented in Europe (Marseilles, France and Cambridge, England). It is the European A.I. language of choice, and was selected by the Japanese as the basis of their Fifth Generation Project. This version of Prolog was created by the inventors of the language, and includes the latest developments.

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The Macintosh Section

PROGRAMMING

BY GARY B. LITTLE

PART II

68000 ASSEMBLY-LANGUAGE PROGRAMMING

Last month we saw that a complete 68000 instruction is made up of an instruction mnemonic and up to two operands that tell the 68000 where to find data to work with and where to store results. To review, the general form of a two-operand instruction, such as MOVE, is:

MOVE source_operand,dest_operand

A location to be used by an instruction is called an effective address and can be a memory location or an internal register specifically referred to in the instruction, or can be a memory location calculated by the addition of as many as three different quantities. The availability of so many different ways to access data permits you to write efficient and powerful programs.

You tell the 68000 how to calculate an effective address by specifying an addressing mode for each operand an instruction uses.

You can use 12 fundamental addressing modes with the 68000. The assembler formats for these modes (as suggested by Motorola, the designer of the 68000) are summarized in figure 1, as are the effective-address calculations for each mode. Be aware, however, that not all instructions can use each addressing mode. To determine which are permitted, you'll have to consult the detailed description for the instructions in question in the Motorola reference manuals.

Let's now look at each of the addressing modes.

The availability of so many different ways to access data permits you to write efficient and powerful programs.

A few 68000 instructions don't require you to specify all operands, because the "missing" operands are implicit to the instruction. The implicit operand usually involves the program counter, the stack pointer, or the status register.

For example, when you use the JMP (jump) instruction, the only operand you have to specify represents the target address of the jump. You don't have to indicate that this address is to transfer into the program counter: this requirement is implicit.

Immediate

An immediate operand is a numeric constant that forms part of the one to five words each 68000 instruction occupies. Its location within the instruction is the effective address.

The assembler format for the Immediate addressing mode is #*number*, where *number* represents an absolute number or a symbolic label for a number. The # symbol preceding the number is very important; if you don't include it, the instruction will assemble as if the operand were an address, rather than a constant, so the program won't work properly. Examples of immediate operands are:

```
#45          ;decimal 45
#$2D         ;hex 2D (45)
#mySize      ;symbol
```

Notice that hexadecimal numbers are preceded by a $ character.

Data Register Direct

When you use this addressing mode, the operand is simply one of

the eight data registers, D0–D7. To select this mode when you write a program, refer to the data register as Dn (n = 0–7). Here are some simple examples of how to use the Data Register Direct addressing mode:

```
MOVE #4,D0      ;4 -> D0.W
CLR.L D4        ;0 -> D4.L
```

When you use the Data Register Direct addressing mode, you can deal with operands that are three different sizes: byte, word, and long word. To indicate the size of the operand, you attach one of the following suffixes to the standard instruction mnemonic:

.B (byte)
.W (word)
.L (long word)

When you specify a suffix, the instruction uses only the first 8 (byte), 16 (word), or 32 bits (long word) of the data register. If you don't do so, your assembler will assume it's dealing with a word operation.

Address Register Direct

The operand here is one of the eight address registers, A0–A7. You refer to an address register by a name of this form to select the Direct addressing mode. (A7 is usually referred to as SP, for *stack pointer*.)

Here's an example of how to load the address with the label Record into the address register A0:

```
LEA Record,A0
```

Although you don't have to store addresses in an address register, you will often use them for that purpose so you can take advantage of the 68000's powerful Address Register Indirect addressing modes. You typically use these modes after first storing the base address of a data structure in an address register—you can't use the indirect modes with data registers.

Address Register Indirect

The operand here is one of the eight address registers, but the effective address that instructions act on is the address stored in the register, not the register itself. To indicate this addressing mode, you enclose the name of the address register in parentheses. The assembler format for this addressing mode is *(An)*.

Here are two examples:

```
MOVE.L      #4,(A3)
MOVE        D0,(A2)
```

You should be careful not to confuse this indirect mode with the Direct mode, in which data is read from or written to the register itself. Whenever you see the parentheses, think "contents of."

Address Register Indirect with Post-Increment

This addressing mode is quite similar to the Address Register Indirect mode, except that after the processor uses the effective address, it increments the number in the address register by 1 (for a byte operation), 2 (for a word operation), or 4 (for a long

NAME OF ADDRESSING MODE	EFFECTIVE ADDRESS CALCULATION	ASSEMBLER SYNTAX
Data Register Direct	EA = Dn	Dn
Address Register Direct	EA = An	An
Register Indirect	EA = (An)	(An)
Register Indirect with Post-Increment	EA = (An), An = An+N	(An)+
Register Indirect with Pre-Decrement	An = An–N, EA = (An)	–(An)
Register Indirect with Displacement	EA = (An)+d16	d16(An)
Register Indirect with Index	EA = (An)+(Rn)+d8	d8(An,Rn)
Absolute, short	EA = (next word)	xxxx
Absolute, long	EA = (next long word)	xxxxxxxx
PC Relative with Displacement	EA = (PC)+d16	d16(PC)
PC Relative with Index	EA = (PC)+(Rn)+d8	d8(PC,Rn)
Immediate, standard	Data in next word/words	#xxxx
Immediate, quick	Data in operation word	#xx
Implicit	EA = SR, SP, PC, USP	

ABBREVIATIONS

EA	= effective address	SP	= stack pointer (same as A7)
Dn	= data register (n = 0–8)	USP	= user stack pointer
An	= address register (n = 0–8)	N	= 1 for bytes, 2 for words, 4 for long words
d16	= 16-bit signed displacement	( )	= "contents of"
d8	= 8-bit signed displacement		
Rn	= address or data register used as index (n = 0–8)	xx	= byte-length number
PC	= program counter register	xxxx	= word-length number
SR	= status register	xxxxxxxx	= long-word-length number

Figure 1: 68000 addressing modes

word operation). You designate this addressing mode by placing parentheses around the name of the address register, followed by a plus sign to indicate the post-increment operation: *(An)+*.

The Post-Increment addressing mode is particularly useful when you're moving ranges of memory from one place to another, because you don't have to follow each move with extra instructions to increment the base pointers for the two blocks. For example, consider the instruction

```
MOVE        (A0)+,(A1)+
```

If you execute this instruction ten times in a row, the 68000 will move the ten words beginning at the initial address stored in A0 to a block beginning at the initial address stored in A1. After each word moves, the address registers increment by two (it's a word operation), so that you're automatically ready to move the next word.

Post-increment addressing is also handy for removing ("popping") data that you pass onto the 68000's hardware stack, as we will see at the end of this article.

Address Register Indirect with Pre-Decrement

This addressing mode is primarily for adding items to the hardware stack. You designate it by placing a minus sign before the name of an address register enclosed in parentheses: *-(An)*.

The 68000 calculates the effective address by first decrementing the contents of the address register by 1 (for a byte operation), by 2 (for a word operation), or by 4 (for a long-word operation). The address it acts on is the new address in the register.

Address Register Indirect with Displacement

The 68000 calculates the effective address here by adding a 16-bit word with a plus or minus sign (a "sign-extended" word) to the address stored in an address register. The assembler format for this addressing mode is *d16(An)*, where *d16* represents a number from –32768 to 32767, or a symbolic label for such a number. If you use a number or label, do not precede it with #, as you would do if you were using the Immediate addressing mode.

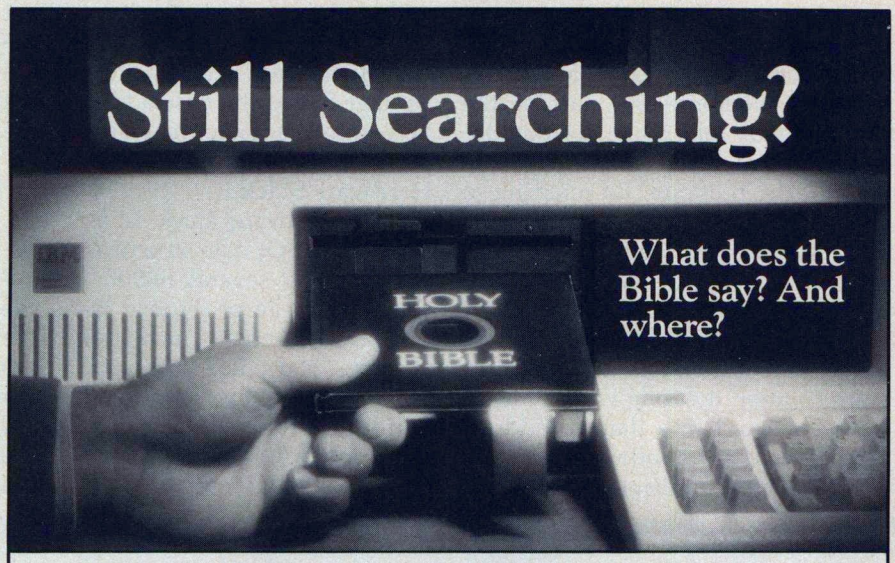
This addressing mode is typically for accessing a specific item in a data structure whose base address is stored in the address register. For example, if there's a data structure beginning at location Addresses in your program, and you want to read the third word in the structure, you could use the instructions

```
LEA         Addresses,A0
MOVE        4(A0),D0
```

As we'll see next month, you'll be using this addressing mode quite often on the Macintosh, because any variables you define within the program must always be referenced as displacements from the address stored in the A5 register. So, for example, if you call your variable MyRecord, a MyRecord(A5) operand gives its base address, and the address of the third word in the data structure is MyRecord+4(A5).

Address Register Indirect with Index

The 68000 calculates the effective address for this addressing mode by adding together the number stored in an address register, an index stored in another address register or a data register (sign-extended word or long word), and an 8-bit, sign-extended, displacement byte. This mode is the



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most complex of the 68000's addressing modes, but, as you can see from figure 2, it is not too difficult to visualize what is happening.

The assembler format for this mode is *d8(An,Rn)*, where *Rn* represents the data or address register being used as the index register and *d8* represents an eight-bit number or a symbolic label for the number. In order to indicate whether the index register is a word or a long word, you add a .W or .L suffix to the Rn name in the instruction; examples are D3.L, A0.W, and D2.W. If you don't specify a suffix, the assembler assumes a word index. Note that since the displacement byte is only eight bits long, the displacement range is from −128 to +127. (The base point is the word following the first word of the instruction.)

This indexed addressing mode is useful when you're working with a group of fixed-length records. To access any record in the group, you first store the address of the first record (record 0) in an address register, then multiply the record number you want by the number of bytes in the record, and store the result in the index register. When you access the record, you can use the displacement byte to step to the field in the record in which you are interested.

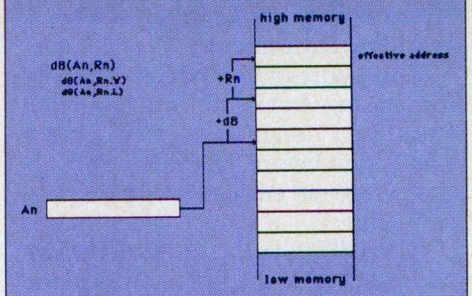
Absolute

The effective address for the Absolute addressing mode is the specific address that is stored in the instruction bytes. The assembler format is *$abcdef*—i.e., a six-digit hexadecimal number (or a symbolic label).

Note that if you use a label that refers to a position within your application program, Macintosh assemblers use the Program Counter with Displacement addressing mode instead.

Program Counter with Displacement

The effective address is the sum of the address in the program-counter register and a sign-extended, 16-bit displacement word.



The effective address is the sum of the contents of the An register, a sign-extended 8-bit displacement word, and a word or long word index in a data or address register (Rn).

Figure 2: Address Register Indirect with Index addressing mode

The assembler format is *label(PC)* or *label*, where *label* represents the symbolic label for a position within the program. The assembler automatically determines what the displacement between the program counter and the labeled position will be and puts it into the executable object code for the program. You should never have to calculate it yourself.

Program Counter with Displacement is a very important addressing mode on the Macintosh because all the programs you write must be relocatable (that is, able to run at any position in memory)—no part of the program may refer to an absolute location if that location is within the body of the program. By referring to addresses in a relative way, the operating system can load and run the program anywhere it wants.

Program Counter with Index

The effective address for this mode is the sum of the address in the program counter, the long word or sign-extended word in a data or address register used as an index, and a sign-extended eight-bit displacement byte. The assembler format is *label(PC,Rn)*, where *Rn* represents the data or address register being used as the index and *label* represents the location of another instruction in the program. The assembler converts this location into an eight-bit offset from the value of the program counter.

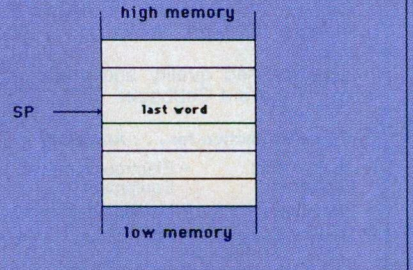
As with the Address Register Indirect with Index Mode, the index register can be a word or a long word. Use the .W or .L suffix to identify its size.

The Program Counter with Index Addressing Mode requires one extension word. The first byte contains information relating to the index register and its size. The second byte contains the eight-bit displacement. Note that since the displacement byte is only eight bits long, the displacement range is from −128 to +127. (The base point is the word following the operation word.) Thus, the data structure you're indexing into must be quite close to the instruction.

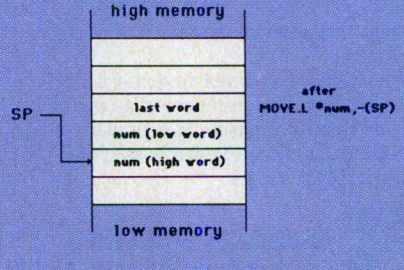
The Program Counter with Index addressing mode is quite similar to the Address Register Indirect with Index that we looked at earlier. In fact, it's possible to write code to access records in a data structure that uses either addressing mode. The advantage of using the Program Counter with Index mode is that you don't "waste" an address register for storage of the base address. The disadvantage is that the base address must be within the range the eight-bit displacement byte provides.

Hardware Stack

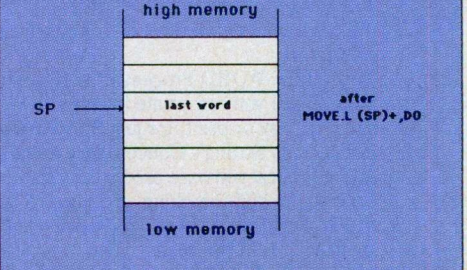
The hardware stack is a last-in, first-out (LIFO) data structure implicitly used by several 68000 instructions that store or retrieve data. The LIFO characteristic means that the last item you place (or "push") onto the stack is the first item removed (or "pulled") from it. Figure 3 shows what a stack looks like and where data is pushed onto it and pulled



The stack pointer always points to the last word pushed on the stack.



After a "push" operation SP is decremented by the size of the item. Use the −(SP) addressing mode for this.



After a "pop" operation SP is incremented by the size of the item. Use the (SP)+ addressing mode for this.

Figure 3: The 68000 stack and stack pointer. The address at the top of the stack is stored in the current stack-pointer register, SP.

from it. The address of the top of the stack (the address of the last item pushed onto the stack) is stored in the current stack-pointer register, SP (the A7 register). The Macintosh operating system initializes its value when you start up.

When you push data onto the stack, the 68000 first decrements the stack pointer by the size of the data and then stores the data at the address stored in the stack pointer. Note that since the processor decrements the stack pointer when you place something onto the stack, the stack grows downward in memory.

The most common instructions that implicitly push data onto the hardware stack are JSR and BSR, which push long-word addresses (of the following instruction) before calling a subroutine.

When you pop data from the stack, the stack pointer increments by the size of the data. The most common instruction that implicitly pops data from the hardware stack is RTS—it pops addresses a JSR or BSR instruction has pushed there. It pops into the program counter, so that processing continues with the instruction following the original JSR or BSR.

You can explicitly use the stack for temporary data storage by using the SP Indirect with Pre-Decrement addressing mode, –(SP), to place data onto the stack. When you want to remove data, you can use the corresponding post-increment addressing mode, (SP)+. We're going to see next month that most of the internal ROM subroutines used on the Macintosh to perform standard operations are accessed by passing parameters on the stack using the pre-decrement addressing mode; function results are retrieved from the stack using the Post-Increment addressing mode.

The hardware stack can be positioned anywhere in memory, but you usually place it near the top of the available RAM space to leave as large a space as possible for program use.

Well, that's it for this month. Next month we'll see how to generate a simple 68000 program with the assembler tools in the Macintosh 68000 Development System (MDS). ✚

Look for Gary Little's next book, 68000 Programming on the Macintosh, *this fall. Gary is also the author of Point-to-Point, a communications program for the Apple II published by Pinpoint Publishing.*

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pegboard ACCOUNTING SYSTEMS

SOFTWARE *BY RUSEL DEMARIA*

Plains & Simple from Great Plains Software and MacOneWrite from Sierra On-Line bring one-write accounting to the Macintosh.

"Pegboard" accounting systems have been popular with small businesses for many years. They are also called one-write systems because they are designed to post information to several places at once. For instance, when you write a check, the carbon paper transfers the information to a cash-disbursements ledger and also to a ledger card for the vendor or recipient of the check. The same principles apply to the recording of receivables.

Now computer programmers are discovering how naturally the pegboard system fits into computerized accounting. Two fine examples for the Macintosh are Plains & Simple from Great Plains and MacOneWrite from Sierra On-Line.

Plains & Simple

Plains & Simple is a fully integrated one-write accounting program that includes General Ledger, Accounts Receivable, and Accounts Payable modules. Remarkably, the entire program comes on one disk. The program requires either a second floppy-disk drive or a hard disk for data, depending on the amount of information involved. You can use Plains & Simple to run one or more companies.

Plains & Simple is extensively icon-oriented, a wonderful adaptation of the Macintosh operating environment. You begin work from a central screen divided into three parts: G/L, A/R, and A/P (see figure 1). By selecting the appropriate icon, you can open up Chart of Accounts, General Ledger, General Journal, Sales/Cash Receipts or Purchases-/Cash Disbursements Journals, Customer or Vendor Cards, Company Information, and Reports.

Although the Plains & Simple manual does a good job of guiding you in the use of the program, it stresses often that you should leave the initial setup to someone well versed in accounting principles. The manual includes an excellent tutorial that uses the sample information that comes on the disk.

Visually, Plains & Simple is just like a paper ledger system (see figure 2). You post all transactions on a grid that looks like a piece of paper. You can add or remove accounts from the display at any time. Although you can display your entire chart of accounts, you will probably limit the display to the accounts you deal with most frequently. You can scroll quickly to accounts that are off the screen by using the Tab key or the horizontal scroll bar.

Plains & Simple comes with 27 sample charts of accounts, ranging from service stations to medical offices (with real-estate agencies, restaurants, general retail outlets, and others in between). The 27 charts have enough variety to assure that most small businesses will find one that suits their needs with little or no modification. You can also choose which accounts will appear on summary reports.

Plains & Simple is a versatile system. For instance, you can enter transactions directly from the appropriate monthly journal or from one of the customer or vendor cards. In either case, the transaction posts to both places. You can also apply payments selectively to invoices. Because the program is all on one disk, all in-

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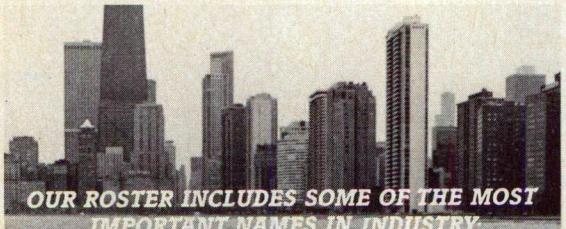

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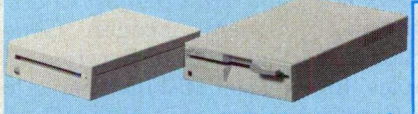

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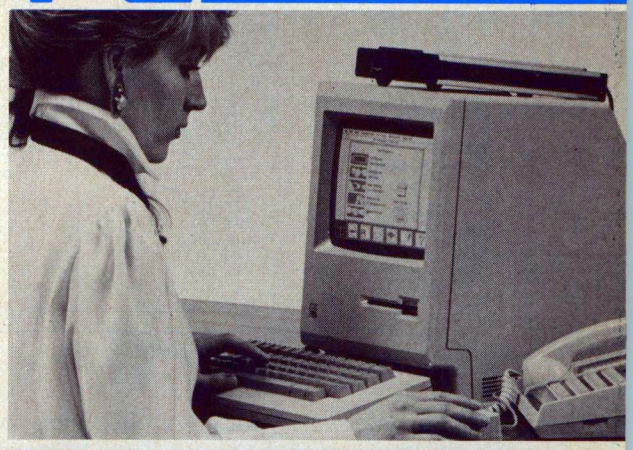

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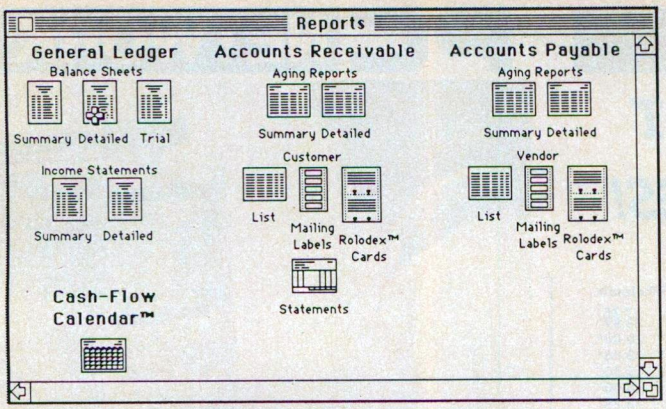


Figure 1: Plains & Simple's Reports menu screen

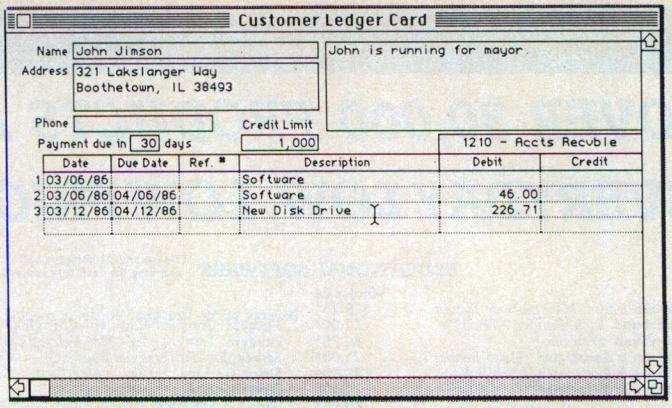


Figure 2: A customer ledger card from Plains & Simple

formation integrates automatically, and reports are up to date.

You can also add new customer or vendor cards at any time (even during transactions), or you can use a special miscellaneous classification for a one-time customer or vendor. When you select customers or vendors, you can select from Active, Due, Updated, all cards, or one individual card (see figure 3). Once you have made the selection, you can page from one card to another at will. You can set credit limits and terms on the cards. If you enter a transaction that exceeds a credit limit, the program alerts you.

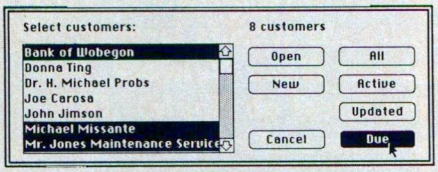


Figure 3: Choosing a customer ledger card with Plains & Simple. Note the choices and the highlighted entries under Due.

Numerous effort-saving features make Plains & Simple a joy to use. For instance, the first time you enter a date in a particular journal, you might enter the month and day (the program adds slashes for you). After thus establishing the month, you need only type the day. You can add a transaction for the wrong month, but the program will warn you before proceeding.

Typing part of a customer or vendor name is sufficient; the program displays the appropriate list, highlighting the closest match. The Auto Enter feature lets you balance any transaction automatically—Plains & Simple doesn't allow unbalanced transactions.

MacOneWrite

Sierra On-Line first introduced the Cash Disbursements module of MacOneWrite in June 1985. Since then the company has added an Accounts Receivable module and a General Ledger. A Payroll module is still under development. MacOneWrite carries the pegboard metaphor about as far as it can be carried on a computer—down to the pegs themselves and the holes in the ledger paper (see figure 4). If you are already familiar with pegboard systems, you should feel right at home.

The three existing modules of MacOneWrite come on three separate disks; the system works well with any configuration, from a single disk drive to a hard disk. Although each module is independent and Accounts Receivable can integrate with Cash Disbursements, the best way to use MacOneWrite is with all three modules. You use the General Ledger to enter transactions not applicable to the other modules, to integrate data, and to produce most final reports.

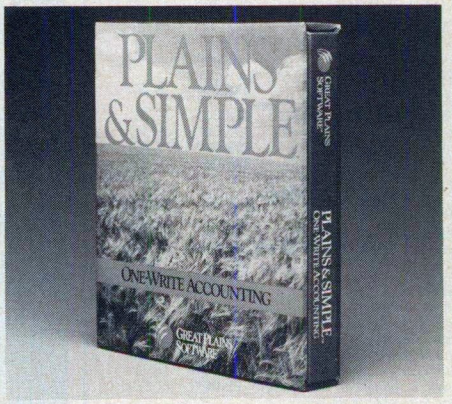
Each module has its own accounts file. The C/D and A/R modules can share the same accounts file (on a hard disk or external disk drive), but the G/L accounts file is more extensive and also includes budgets and a user-definable category for groupings on balance sheets and income statements. This ability to group accounts allows you to control the output of your reports and group all accounts appropriately. The C/D module can produce limited reports, but you cannot control groupings or display budget information with it.

Each module comes with a clear, informative manual and some sample files. The G/L manual even includes some basic accounting information that might be handy for novices.

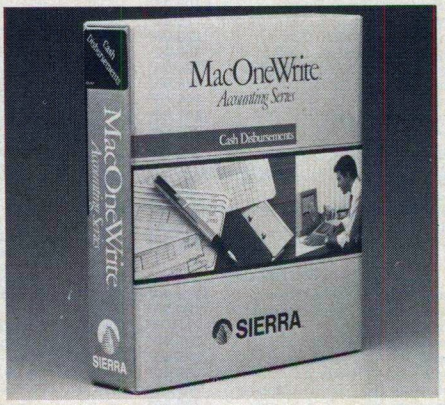
You can call up your chart of accounts any time. Normally you fill in accounts by account number, but if you can't remember the number, you can call up the chart, highlight the desired account, and insert it automatically into the current journal.

Even better news is that you can set default accounts for various kinds of transactions in A/R journals. For instance, for invoices you might always disburse the transactions to your Sales and your Tax Liability accounts. For recording payments, you might use the main Cash in Bank account and, perhaps, Discounts Allowed. Thus you avoid having to reenter account numbers. Unfortunately, the C/D module does not include the default-account feature.

In the A/R and C/D journals, you select from a pull-down menu the kind of transaction (invoice, payment, credit memo, and the like) that you



Plains & Simple from Great Plains Software



MacOneWrite from Sierra On-Line

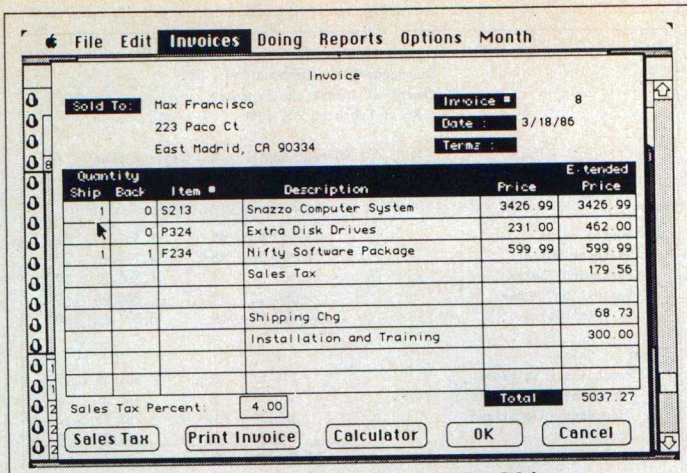


Figure 4: A detailed invoice screen from MacOneWrite

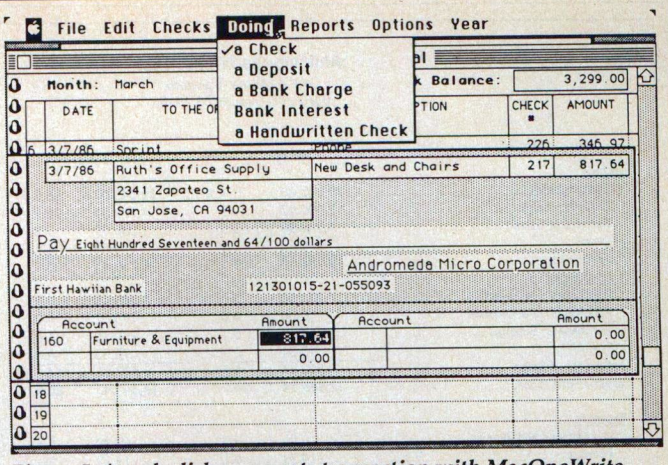


Figure 5: A cash-disbursements transaction with MacOneWrite

want. This selection stays in effect until you change it. Fortunately, you can begin an invoice, for instance; find that you meant to enter a payment; and change the choice without losing the information you've already entered (assuming you haven't posted the transaction yet).

Most transactions automatically use the system date or the most recently used date, and the program warns you when you try to enter a transaction for the wrong month. As you split transactions, the program always displays a running total and prevents you from entering unbalanced transactions. If you need to do some extra figuring, the Mac calculator is always available (as it is in Plains & Simple).

You can selectively link payments with invoices by using a special column on the customer card, into which you can place any one-letter code. Items with matching codes will be associated. Thus, to apply a payment selectively to a specific invoice, you label both the payment and the invoice with the same code.

Although you can enter sales transactions without having a detailed invoice, the invoice screen is excellent (see figure 4). The invoice automatically displays totals accumulated from unit prices, calculates the sales tax (at the rate you determine), and produces the grand total. Also, you can mark back-ordered items and add any other charges or credits necessary (before or after calculating the tax). You can then print the invoice on a standard invoice form.

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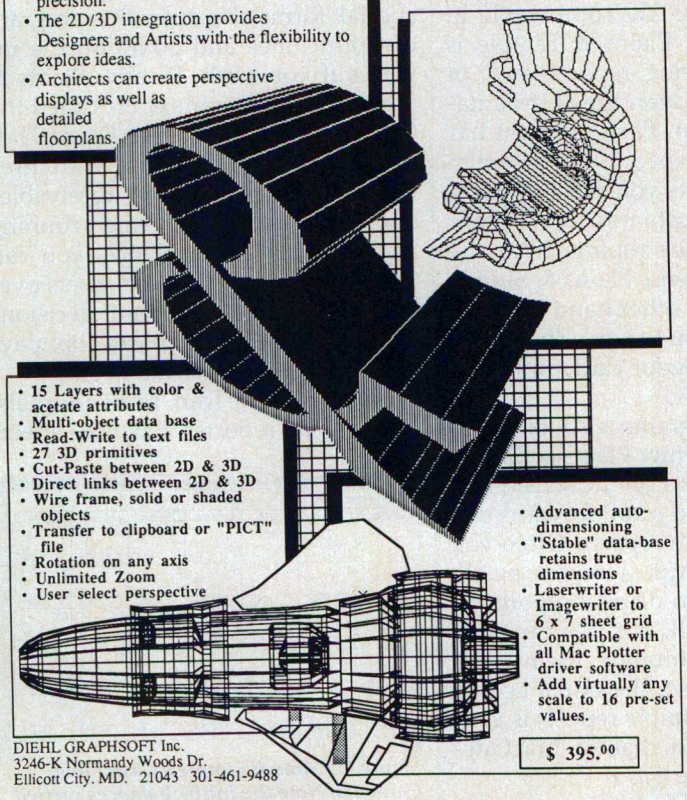

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Andromeda Micro, Inc.
Detailed Income Statement
03/01/86 through 03/31/86

	Period		Year to Date	
Income				
System Sales	$9,845.00	71.4 %	$9,845.00	58.8 %
Software Sales	2,690.97	19.5	4,720.34	28.2
Peripheral Sales	1,240.99	9.0	1,240.99	7.4
Other	8.72	0.1	944.08	5.6
Total Income	13,785.68	100.0	16,750.41	100.0
Cost of Sales				
Purchases - Software	771.00	5.6	1,283.55	7.7
Purchases - Peripherals	0.00	0.0	780.37	4.7
Purchases - Supplies	17.63	0.1	269.76	1.6
Freight In	13.51	0.1	73.33	0.4
Total Cost of Sales	802.14	5.8	2,407.01	14.4
Gross Profit (Loss)	12,983.54	94.2	14,343.40	85.6
Expenses				
Maintenance and Repairs	0.00	0.0	69.90	0.4
Postage	14.22	0.1	14.22	0.1
Telephone	346.97	2.5	346.97	2.1
Total Expenses	361.19	2.6	431.09	2.6
Net Operating Income (Loss)	12,622.35	91.6	13,912.31	83.1
Other Income				
Other Income	0.00	0.0	820.46	4.9
Total Other Income	0.00	0.0	820.46	4.9
Other Expenses	0.00	0.0	0.00	0.0
Net Other Income (Loss)	0.00	0.0	820.46	4.9
Net Income (Loss)	$12,622.35	91.6 %	$14,732.77	88.0 %

Andromeda Micro Corporation
Statement of Income and Expenses
As of February 28, 1986

	Current Month Amount	% Sales	Year-to-Date Amount	% Sales
Sales				
System Sales	9,453.90	69	9,453.90	61
Software Sales	2,492.36	18	4,117.10	27
Peripheral Sales	1,506.21	11	1,506.21	10
Consulting Income	300.00	2	300.00	2
Total Sales	13,752.47	100	15,377.21	100
Cost of Sales				
Purchases - Software	379.67	3	507.55	3
Purchases - Peripherals	780.37	6	780.37	5
Purchases - Supplies	129.58	1	252.13	2
Freight In	47.24	0	64.82	0
Total Cost of Sales	1,336.86	10	1,604.87	10
Gross Profit	12,415.61	90	13,772.34	90
General and Administrative				
Repairs & Maintenance	69.90	1	69.90	0
Total General & Admin.	69.90	1	69.90	0
Net Operating Income (Loss)	12,345.71	90	13,702.44	89
Other Income & Expenses				
Other Income	51.32	0	51.32	0
Net Income(Loss) before taxes	12,397.03	90	13,753.76	89

Figure 6: Comparing the visual appeal of a Plains & Simple report (left) and a MacOneWrite report (right)

You can also print checks with MacOneWrite and/or record manually written checks (see figure 5). The system remembers which checks it has not yet printed and prints them out when you are ready.

MacOneWrite automatically posts transactions to customer and vendor cards in the system. By calling up one of these cards, you can see at a glance all of that particular client's or vendor's activities. When entering names onto invoices or checks, you need type only part of the name, and the program fills in the rest. You can also print out a full A/R journal or an aged A/R journal at any time (even in the middle of a transaction) and add customer and/or vendor cards. When printing customer statements, you can add specified late charges on all balances over a certain age. You can also specify balance forward only or open items on the statement.

Finally, the MacOneWrite G/L lets you produce a SYLK file for use with Macintosh spreadsheet programs such as Excel or the Jazz spreadsheet module. Such a spreadsheet file contains all the proper labels, the entire chart of accounts, and all the data for up to two years.

Comparisons

Two significant differences distinguish Plains & Simple and MacOneWrite from each other. First, MacOneWrite does not have a full Accounts Payable module—it has Cash Disbursements, but no aging of accounts payable. In contrast, Plains & Simple has a full A/P journal.

The second significant difference is that MacOneWrite comes on three separate disks, and Plains & Simple is all on one. On a hard disk, this distinction becomes fairly meaningless, but with floppies it makes a noticeable difference. On the other hand, you can use MacOneWrite with a single floppy-disk drive, and with Plains & Simple you cannot.

Both programs are comparable in speed, although Plains & Simple is faster at producing reports and, of course, has the advantage of instantaneous integration. Each program has features that expedite data entry. MacOneWrite lets you call up charts of accounts, customer or vendor cards, and various reports from the transactions screens; Plains & Simple does not. On the other hand Plains & Simple allows you to work directly on a customer or vendor card, and MacOneWrite doesn't.

The two programs also differ in their reporting setup. Plains & Simple displays all reports on the screen first and allows you to scroll forward and backward through reports. Often you don't have to print a report at all. MacOneWrite can display reports on the screen as well, but you can only page forward through them—you can't go back. Also, the visual appeal of the Plains & Simple reports is generally superior to that of MacOneWrite's (see figure 6).

Plains & Simple can print any journal (the format can be quite wide, since you can print sideways on the paper); charts of accounts; summary detailed, and trial balance sheets; summary and detailed income statements; summary and detailed aging reports for both A/R and A/P; checks; master lists, mailing labels, and Rolodex cards for customers and vendors; and aged invoices with open items or balance forward for customers. Moreover, you don't even need special forms, because the program can print lines and boxes on the invoices if you wish. Finally, Plains & Simple has a special report called the Cash Flow Calendar (see figure 7). It displays a month at a time, with three numbers on each day: receivables due, payments due, and running bank balance. At a glance, you can tell a lot about your liquid assets over time and make informed decisions about upcoming purchases, tax payments, or other financial events.

MacOneWrite can print journals; aged A/R reports; balance sheets

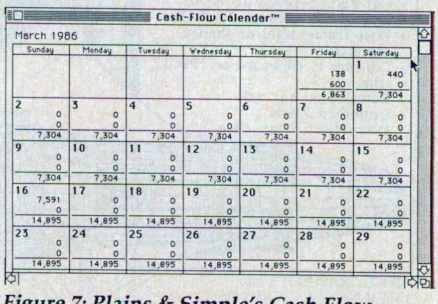

Figure 7: Plains & Simple's Cash Flow Calendar. Note the initial balances carried over from previous months, and the payment on the 16th.

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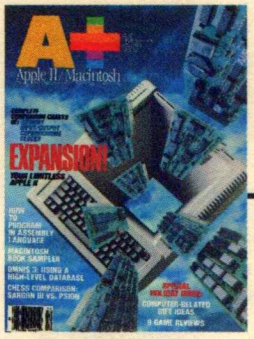

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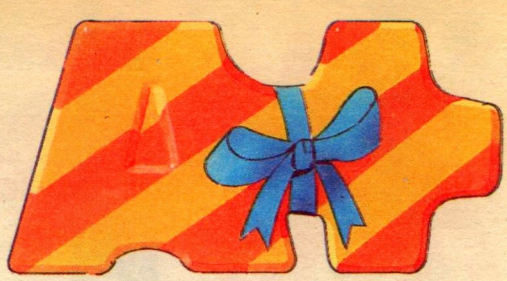

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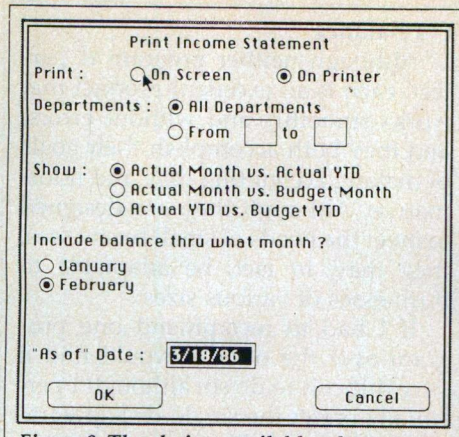

Figure 8: The choices available when you are printing an income statement with MacOneWrite

with or without budgets; trial balances; income statements with or without budgets; report-groupings lists; detailed invoices and/or statements; sales slips for cash sales; mailing labels; checks; master customer or vendor lists; vendor year-to-date lists; charts of accounts; and a special year-end report (see figure 8).

Both programs can automatically reverse an erroneous entry, and both keep an unalterable audit trail. You may encounter minor problems when you make accounting errors, but both programs catch errors in most cases before they cause any confusion. Although they do not completely protect you from the chaotic effects of sloppy or erroneous accounting, they can help immeasurably. These are excellent programs and provide error-free performance when you use them intelligently.

The two programs differ somewhat in the general ledger. MacOneWrite erases all general-journal entries after first printing and then posting them. Plains & Simple keeps all general journals intact and also makes special use of the general ledger. By examining the general ledger, you can review summaries of any transactions for any date, for any account you select. If you want to see the detail of a transaction, you can open a special Zoomed Journal that displays the transactions that occurred on a certain date that affect the specified account. This feature can help you find errors and examine the history of any specific general-ledger account.

Customer support at both companies was responsive and helpful. The people whom I called knew what they were talking about, and on the rare occasions when they did not know, they found someone who did.

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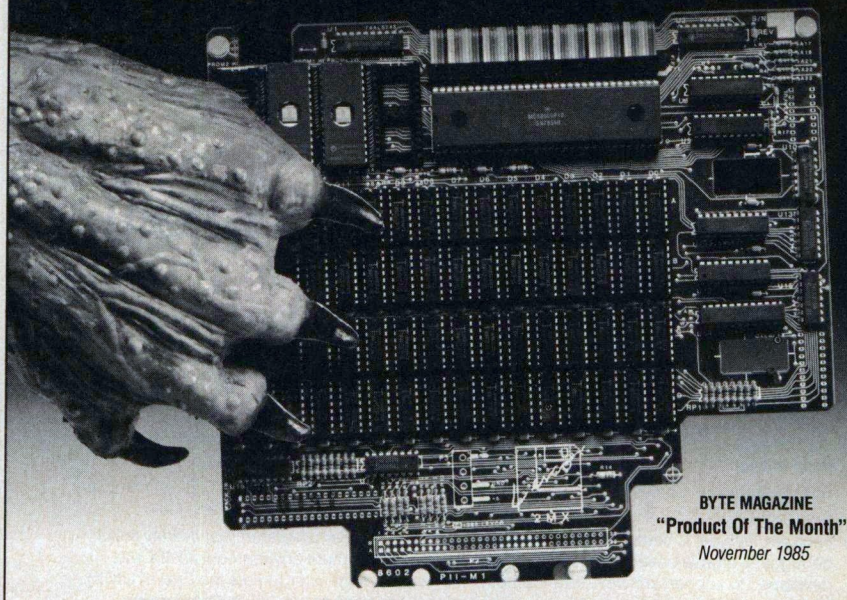

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CIRCLE 189 ON READER SERVICE CARD

On Balance

Although neither program is perfect, each is an excellent product that works smoothly and without errors, and they both accomplish their goals of making accounting easy and informative. Although they are designed to meet the needs of small businesses, they may, in fact, be adaptable to businesses of various sizes.

If I had to recommend one program over the other, I would find it very difficult to do so, although I personally prefer the single-disk integration of Plains & Simple since I work with a dual-floppy system. Also I prefer the full Accounts Payable module that Plains & Simple offers.

Both programs make excellent use of the special features of the Macintosh and are equally easy to use and learn. The copy-protection schemes they employ are relatively painless and unobtrusive. The visual and operational differences between the two programs are noticeable, but since both methods are appealing, a preference of one style over the other is largely subjective. I see no objective way to rate one over the other.

The best advice is to try to preview any program as complex, time-consuming, and personal as an accounting program. You'll depend on it a lot once you begin to use it, and you'll probably use it often. So it helps to like the program. +

Rusel DeMaria is a free-lance computer consultant and columnist for The Maui News. *He lives in Hawaii.*

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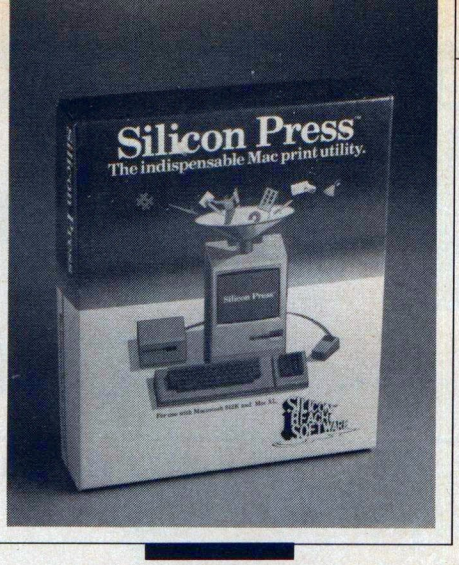

Quick Take

BY S. VENIT

Silicon Press

A Macintosh program that makes it easy to print labels and tags

Silicon Press is a program for the Macintosh that lets you create designs for cards, stickers, or labels of virtually any size and print them out in layouts of columns and rows on an ImageWriter, LaserWriter, or Epson printer. The package is a time saver for anyone who regularly prints identification tags, mailing labels, disk labels, price stickers, personalized greeting cards, or anything else that varies from the standard 8½ × 11-inch full page—from small stickers or Rolodex cards up to a 17 × 17-inch layout.

You can print rows and columns of the same image or merge data from a data file to vary the text on each label or tag. You can also include graphics imported from other programs such as MacPaint or MacDraw and print multicolored labels with an ImageWriter II with a color ribbon.

When you open a Silicon Press file, the screen displays two or three windows: a design window, which shows the design for a single label; a layout window, which shows the arrangement of labels to be printed on a full page; and (if applicable) a data window, which shows the data records to be merged with the design in printing. The design window can include graphics (pasted in from the Scrapbook and sized to fit), text, and names from a merge file. You can have the layout window generated automatically or arrange it manually and can type records directly into the data window or copy them in from a database or merge file. Silicon Press uses the same data-merge conventions as that Microsoft Word does: The fields in each record are separated by commas, the first record in the data file (the header record) lists the field names as used in the merge file, and the merge file identifies field names by enclosing them in international quote marks, also called data-merge marks (« and »).

The feature that makes Silicon Press a desirable replacement or supplement to any database program is its convenience and flexibility in sizing labels and designing full-page layouts. The program automatically sizes the design window for you when you choose the Set Design menu option and specify the size of the label. Similarly, it generates the layout window automatically when you choose the Automatic Layout menu option and specify the horizontal and vertical spacing between labels and the number of rows and columns on a single page. With both options, you can enter sizes in inches or points, you can enter inch measures in decimals or fractions, and the Preferences command lets you choose centimeters instead of inches.

One chronic problem with special formats—no matter what printer or program you use—is aligning the paper precisely in the printer. Typically, you end up wasting a lot of labels in test runs before arriving at the correct positioning. Silicon Press doesn't eliminate the need for trial and error in paper alignment, but it does offer a feature to make this process less wasteful: the Test Print option lets you print one label or one page of labels, showing a dotted rectangular outline around each label. This way, you can make fine adjustments to your on-screen layout before the final print run, and you can use normal paper to test your printout before loading the label paper. Furthermore, when you're print-merging with a data file, the Test Print option prints only one label at a time and positions the print head at the top of the next label, rather than rolling forward a full page as some other merge programs do.

In short, after having tried to produce custom-size labels using various options and combinations of MacWrite, MacPaint, Microsoft Word, Microsoft File, MacDraw, PageMaker, OverVUE, BASIC, and PostScript code, I tend to agree with the claim printed on the Silicon Press package: Silicon Press is "The indispensable Mac print utility" for anyone who regularly prints labels. ✚

S. Venit is a principal in TechArt in San Francisco, a graphics-production and typesetting shop that uses Macintoshes and LaserWriters.

PRODUCT INFORMATION

Silicon Press
Silicon Beach Software, Inc.
P.O. Box 261430
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CIRCLE 330 ON READER SERVICE CARD

MacTips

Suggestions from our readers

MAKING MIMEOGRAPH STENCILS

Mimeograph machines cannot reproduce halftones reliably, which limits mimeographed pictures to line drawings. The Mac doesn't produce halftones, which are dots of different sizes, though, but makes lines and shades of gray by using dots of the same size with different spacings. As a result, stencils from the Mac and ImageWriter produce good graphics on a mimeograph. Tests with my mimeograph machine show that the Mac does a better job than the expensive electronic stencil machine I have, and it does so with the cheaper standard stencil!

I was able to make stencils on the ImageWriter by removing the ribbon, setting the page size to 8½ × 14 inches, and setting the paper-thickness lever inside the ImageWriter to the four-sheet form thickness.

David Smith
Mendham, NJ

UNOBSCURED OBJECTS

While using MacPaint, I accidentally noticed something strange happen when I was attempting to move selected objects around the screen. When you move the arrow from the selected object, it has the shape of a lasso. When the lasso leaves the bottom of the screen, it becomes an arrow again. If you click the mouse at the area where the lasso changes to an arrow at the bottom or side of the screen, you can still move the object that you selected.

This observation may not seem like anything too important, but it has proven to be very useful. Often, when moving small selected objects, I've found that the arrow obscures the object, thereby making it difficult to place. Not anymore. Now I just move the lasso to where it becomes an arrow again at the bottom of the screen, and I can move the object without the arrow being on top of it (see figure 1).

John Hayes
Lima, Peru

KEYBOARD SWITCHER SETS

Macintosh users who use Switcher quickly realize that the most efficient strategy is to save the program configurations you use most often as Switcher "sets." Then, when you want to install your programs in Switcher, you select Load Set from the File menu and choose the appropriate set from the dialog box.

For those of us who like to use the keyboard, Andy Hertzfeld was kind enough to install ⌘ key equivalents for the most frequently used Switcher commands, including Load Set. To choose a Switcher set from the Load Set dialog box, however, you must type a significant portion of the Set's filename.

Keyboard users take heart! By beginning your Switcher-set filename with a number (see figure 2), you can select the appropriate Switcher set with only one or two additional keystrokes. For example, to load the Excel/Word/Sidekick set in figure 2, you type

```
Command-L, 3, Return
```

Although Switcher is the prime example here, this technique works with any application in which you want to load files quickly from the keyboard each time you use the program. Microsoft Word glossaries, File report formats, and Excel macrosheets are other likely candidates for taking advantage of this MacTip.

David K. Simerly
Mountain View, CA

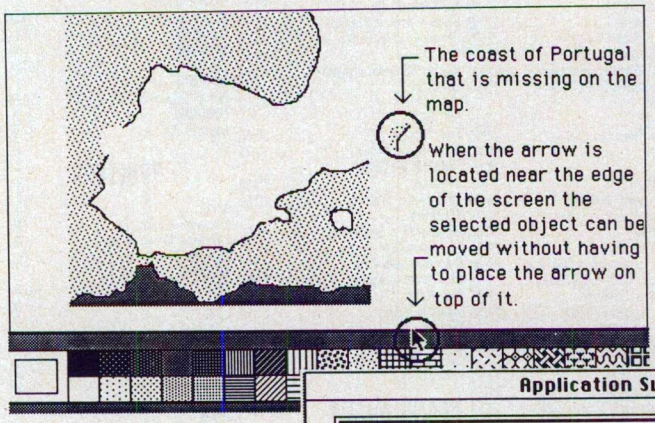


Figure 1: Moving objects in MacPaint without an obscuring arrow

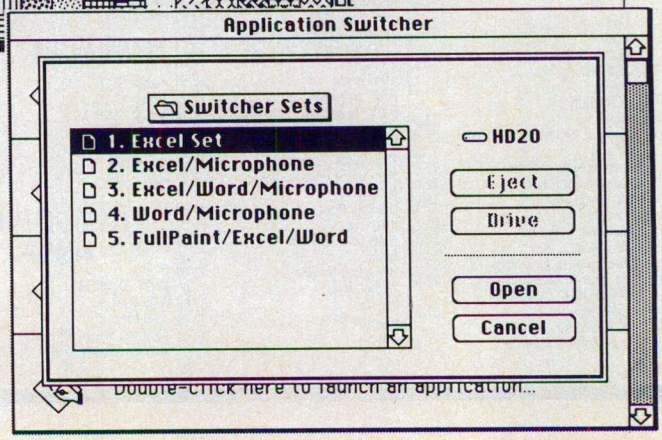
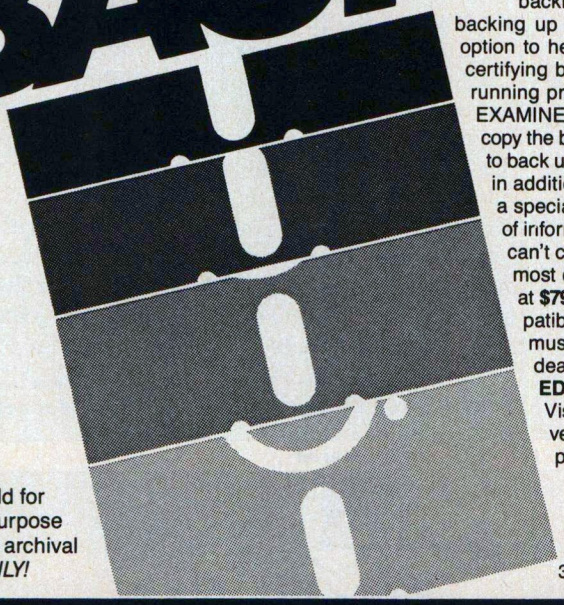


Figure 2: Number your Switcher Set filenames for fast selection.

BACK 4 UP YOUR DISKS



EDD Version 4 is the most powerful copy program available for backing up "uncopyable" or "copy-protected" disks. ■ In addition to backing up disks, **EDD 4** also features a hi-resolution graphic DISK SCAN option to help you locate information on a disk, a CERTIFY DISK option for certifying blank disks, and since it's very important that your disk drives are running properly (especially when copying disks), we have also included an EXAMINE DISK DRIVE option. ■ Even though **EDD 4** has been preset to copy the broadest range of copy-protections possible, **EDD 4** can be "modified" to back up almost any disk that runs on your Apple! ■ For the dedicated user, in addition to **EDD 4,** we are offering an **EDD 4 PLUS** version that includes a specially designed hardware card which allows **EDD** to copy EVERY bit of information from each track accurately! You can bet that if **EDD 4 PLUS** can't copy it, nothing will! ■ **EDD 4** runs on an Apple II, II Plus (including most compatibles, IIe, IIc, and III (using emulation mode), and is priced at **$79.95.** ■ **EDD 4 PLUS** runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at **$129.95** (duodisk/unidisk 5.25 owners must add $15 for a special cable adapter). Ask for **EDD** at your local dealer, or to order direct, include $3 ($6 foreign) shipping/handling for **EDD 4,** or include $5 ($8 foreign) for **EDD 4 PLUS.** ■ Mastercard and Visa accepted. All orders must be prepaid. ■ If you have an earlier version of **EDD,** you can update to **EDD 4** or **EDD 4 PLUS** at a reduced price. Send your **EDD** disk to us, and deduct $50 from your order.

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Pipeline

STAR NB-15 PRINTER

Star Micronics has introduced the NB-15, a 24-wire, dot-matrix printer that offers 100-cps letter-quality and 300-cps draft-quality printing. The printer also has a 16K buffer and twin front-panel slots that accept a choice of five font cartridges. The front-panel displays and selector buttons offer 19 command selections, including three font styles, two print modes, eight form lengths, and margin adjustments. The printer also has a rear tractor feed with a quick-tear feature. *(List Price: $1449)*

Star Micronics, Inc.
200 Park Avenue
Suite 3510
New York, NY 10166
(212) 986-6770

CIRCLE READER SERVICE NO. **500**

MAC

PERIPHERAL LAND DISK DRIVES

Peripheral Land has introduced several hard-disk drives and a tape backup system for Macintosh and Mac Plus computers.

The hard-disk drive Macfast is available in 10-, 20-, and 30-megabyte configurations and comes with a high-speed QIC-2 tape-interface port for use with a streaming-tape drive for making backups. Macstor 10 is a hard-disk drive that uses 10-megabyte cartridges to provide unlimited storage capacity and data security. It also features a closed loop servo for precise head-to-track accuracy. Both Macfast and Macstor attach directly to the computer's system bus via a SCSI interface and are compatible with both the Macintosh and the Macintosh Plus. The firm includes a SCSI-interface adapter card free with all units for 512K Macs.

Designed for the Mac Plus, the PL-20 is a 20-megabyte hard-disk subsystem that also attaches to a computer's SCSI port.

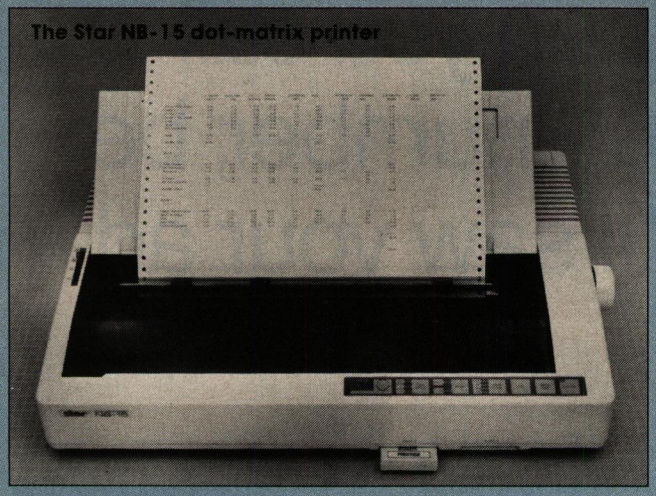
All the above drive units support both HFS and MFS partitioning, use 5¼-inch Winchester-plated media, have built-in cooling fans, and are easy to install. Carrying cases are also available.

For use with Macfast 20 and Macfast 30, the Macfast 20 Tape is a 20-megabyte tape-drive subsystem that uses standard CT-500 digital cassette cartridges. The unit connects to the Macfast drive through its QIC-2 tape interface. The firm includes all software and cables needed to back up a hard disk at a rate of 5 megabytes per minute. Like the other products, the unit has a built-in fan, and an optional carrying case is available. *(List Price: Macfast 20, $1595; Macfast 30, $1895; Macstor 10, $2995; 10-megabyte cartridge, $149; PL-20, $1195; Macfast 20 Tape, $1295; 20-megabyte CT-500 cartridge, $29)*

Requires: Macintosh, 512K RAM

Peripheral Land
3677 Enochs Street
Santa Clara, CA 95051
(408) 733-7600

CIRCLE READER SERVICE NO. **501**

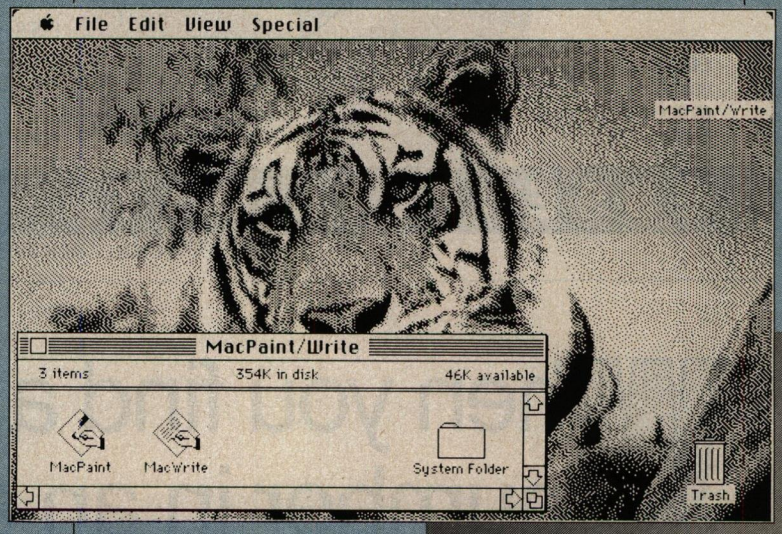


The Star NB-15 dot-matrix printer

MAC

PBI SOFTWARE

PBI has released two new products for Macintosh computers. DeskScene is a utility that lets users customize the computer's desktop screen by replacing the standard patterned background with any MacPaint picture, digitized or otherwise. The program can change the desktop image at random



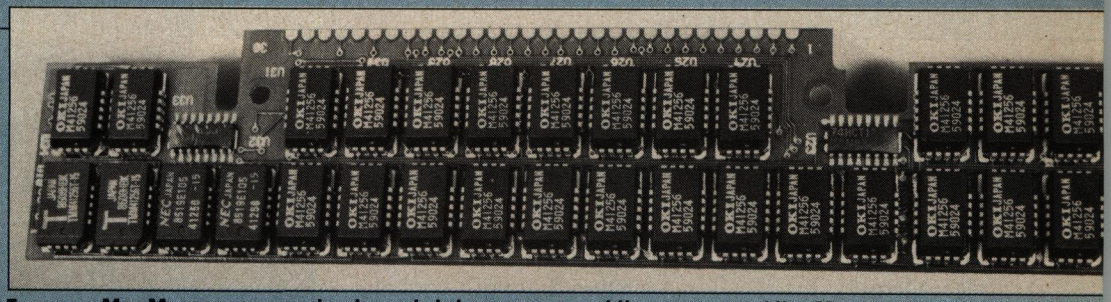
DeskScene lets users customize Mac screens.

if users install more than one picture.

The second product, HFS £ocator Plus, is a desk accessory that is compatible with all programs in the Macintosh Hierarchical File System format. From within an application, users can locate files and folders in which they reside by date or by partial/matching name. After finding a file, HFS £ocator Plus can show information or delete, rename, copy, or move it to another folder. The program can also create new folders. *(List Price: DeskScene, $29.95; HFS £ocator Plus, $24.95)*

Requires: Macintosh
PBI Software, Inc.
1111 Triton Drive
Foster City, CA 94404
(415) 379-8765

CIRCLE READER SERVICE NO. **502**



Two new MacMemory expansion boards let users expand the memory of the Mac and MacPlus by up to 4 megabytes.

II SERIES

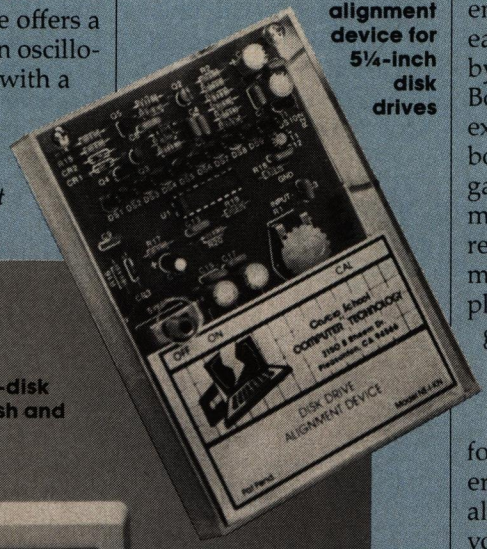
DISK-DRIVE ALIGNMENT DEVICE

The Cascio Alignment Device, Model 525, enables users to perform a read/write alignment on most 5¼-inch disk drives in less than 20 minutes. The easy-to-use device offers a replacement for an oscilloscope and comes with a comprehensive manual, applicable software, and batteries. *(List Price: $129)*

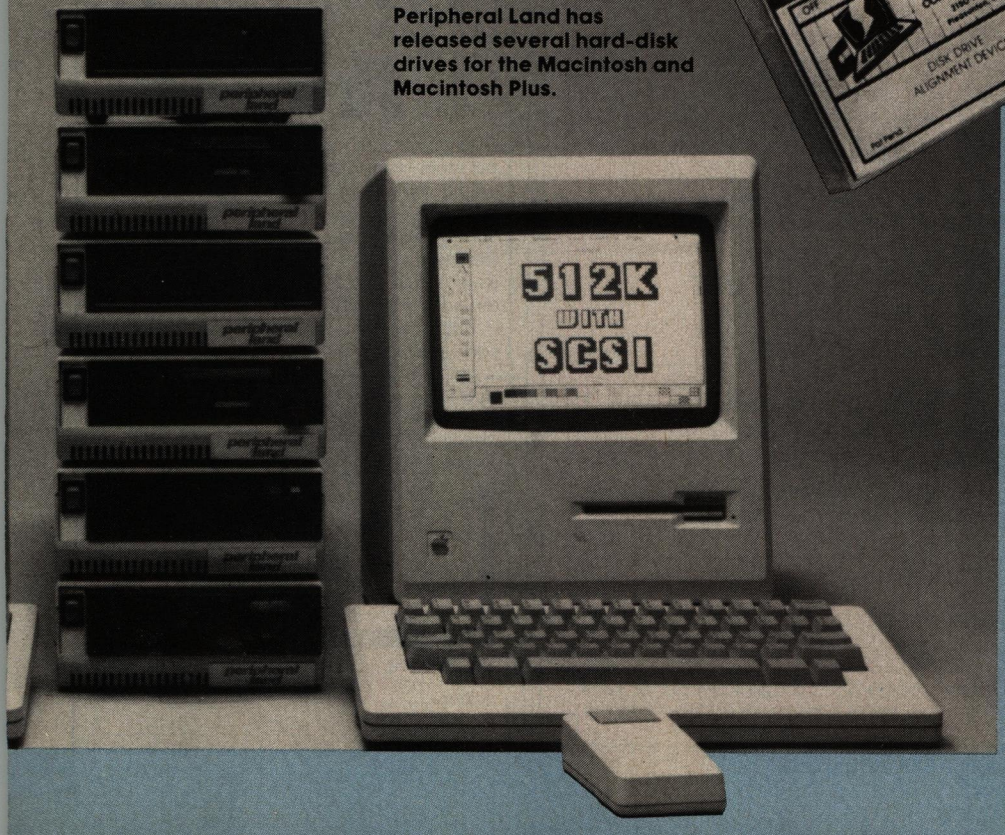
Requires: Apple II
Cascio School of Computer Technology
2150 B Rheem Drive
Pleasanton, CA 94566
(800) 422-7246
In CA (415) 462-7723

CIRCLE READER SERVICE NO. **503**

The Cascio disk-drive alignment device for 5¼-inch disk drives



Peripheral Land has released several hard-disk drives for the Macintosh and Macintosh Plus.



MAC

MACMEMORY EXPANSION BOARDS

MacMemory has released two products—TheMax2 and TheMaxPlus for the Macintosh and Macintosh Plus, respectively—that enable users to expand each computer's memory by up to 4 megabytes. Both products comprise an expandable memory board the provides 2 megabytes of contiguous memory, and both are ready for expansion to 4 megabytes when users plug in 16 of the new megabit chips. MacMemory or a dealer can install TheMax2 in a 128K or 512K Mac in exchange for the computer's motherboard; the product is also available as a do-it-yourself kit. TheMaxPlus is a set of modules that plug into the Macintosh Plus' expansion sockets.

Both products also come with free MaxRAM and MaxPrint software. MaxRAM automatically creates an adjustable 1.5-megabyte RAMdisk that runs ten times faster than a floppy disk. MaxPrint is a desk-accessory print spooler that spools both text and graphics easily. TheMaxPlus package also includes MaxChill, a quiet piezo fan. *(List Price: TheMax2 installed, $795 for 128K, $645 for 512K; The-*

Max2 kit, $635 for 128K, $565 for 512K; TheMaxPlus, $499; MaxRAM and MaxPrint, $49.95)
Requires: Macintosh or Macintosh Plus, 128K or 512K RAM
MacMemory, Inc.
473 Macara Avenue
Suite 701
Sunnyvale, CA 94086
(408) 773-9922
CIRCLE READER SERVICE NO. **504**

HARDWARE

MACDOUBLE D-D

Custom Computer Company (C.C.C.) is now offering an alteration service—MacDouble D-D—that converts a standard single-drive Macintosh computer into a single unit with two internal disk drives. The company performs the alteration on the user's computer in two days.

C.C.C. can also install Mac Clean Air, a cooling system that pulls cool air through a dust filter, distributing it over the power-supply board. The system uses a low-speed, low-noise fan built into the top of the computer. Available as an alternative to this cooling system is Mac Hummingbird, a piezoelectric air mover that reinforces the computer's convection cooling and counteracts the buildup of hot spots. Both these products are also available as do-it-yourself kits. *(List Price: disk-drive installation, $189.95; Mac Clean Air, $129.95 installed, $89.95 kit; Mac Hummingbird, $99.95 installed, $59.95 kit; complete MacDouble D-D system including computer, two disk drives, and filter, $1995)*

MacDouble D-D, a Macintosh with two built-in disk drives

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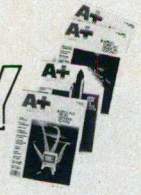

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INTERFACE MODULES PRODUCTS

Interface Modules, Inc. (IMI) has introduced several new products for Apple computer users—the AP Series floppy-disk systems and 8064 and 80256 dual-function cards.

Designed for Macintosh and Macintosh Plus computers, the AP 3.5 floppy-disk drive features 800K of formatted memory, single push-button loading and auto-eject mechanism, low power consumption, and a soft loading function.

Other new releases in the AP Series are the AP 2, AP 2.5, and AP 2.5C for Apple II computers. These drives attach directly to any Apple II disk controller and feature a capacity of 143K, 256 bytes per sector, 16 sectors per track, and 35 tracks per disk.

For the Apple IIe, the 8064 and 80256 dual-function cards offer 64K and 256K RAM, respectively. Both cards also provide high-resolution, 80-column displays. *(List Price: AP 3.5, $349; AP 2, AP 2.5, $199; AP 2.5C, $205; 8064, $79; 80256, $219)*

Requires: Apple II, II Plus, IIe, IIc, Macintosh, or Macintosh Plus

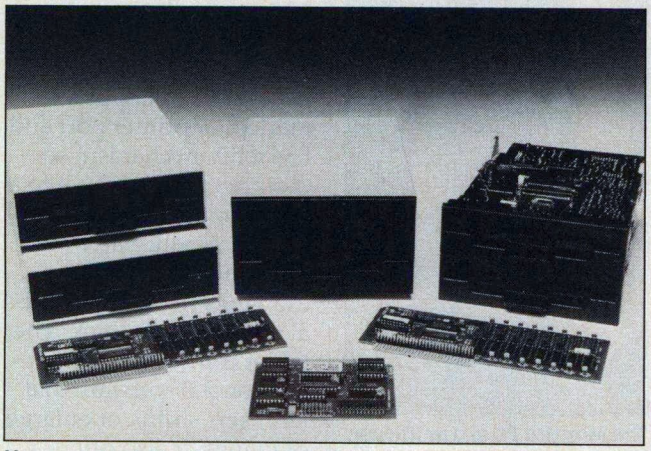
Interface Modules, Inc.
2893 East La Palma
Anaheim, CA 92806
(714) 630-5350

CIRCLE READER SERVICE NO. **506**

VIP CARD

The VIP (Very Intelligent Peripheral) Card is an Apple-compatible robotics controller card that can work either as a stand-alone controller or as a multifunction, intelligent peripheral card. It offers a 55C02 microprocessor, 16 I/O lines, 2 timer/counters, and 8K static RAM.

The card can also be expanded to include 48 I/O lines, 6 timer/counters, and 24K EPROM or static RAM. For robotics or control applications, users can develop programs on an Apple computer and load them directly into the VIP Card. They can then place the card into the robot or machine they wish to control. When used as a peripheral card, the VIP Card plugs into any Apple



New products for Apple computer users from Interface Modules, Inc.

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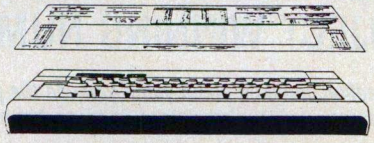

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Lottery: 3-4 digits $79.95; Lotto: max. of 99 digits $99.95; Enhanced Lottery/ Lotto $129.95

PC-3 Portable Computer (4k)
Choice of Thoroughbred/Greyhound/Trotter Gold Edition™ software. $249.95

Model 100 Portable Computer (32k)
Choice of Thoroughbred/Greyhound/Trotter Gold Edition™ software with Master Bettor™ $649.95

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VHS Training Tapes now available

Terms: Free shipping all software. Add $6.00 COD / $6.00 UPS Blue / $9.00 Out-of-country / ID residents add 5% / 3 weeks personal checks / cash price only add 2% Visa, MC, AMEX. Prices subject to change.

CIRCLE 132 ON READER SERVICE CARD

MILLIONAIRE LOTTERY WINNER USES APPLE COMPUTER TO PROJECT WINNING NUMBERS

This headline could be about you if you use the power of your home computer to your advantage in these big state lotteries.

THE LOTTO PROGRAM produces a powerful and complete probability study of the past winning lottery numbers with just single key presses from a main menu. The data generated includes 'hot' or 'cold' numbers, any trend or patterns, sums of digits, odd/even numbers and much more.

If you are really serious about winning, you'll forget random numbers and start making intelligent **PICKS**. It's designed to work in all states that have lotto games and Canada. This low cost program will have your friends asking "what should I play this week", (but you don't have to tell them, do you).

You keep it up to date by simply adding the latest winner each week, and you can produce hard copies on any printer if you so desire. This program will cut those big odds down to size and may even pay for your computer (or your house).

Available for Apple (and most other computers) at only $21.95 and the Super MacIntosh version is only $29.95 and comes with disk, hints and instructions.

Sold at selected software stores including Software City

(Dealer inquiries are invited.)

For fast mail order service write or call Soft-Byte at (513) 233-2200
We accept checks, M.O., or Visa/Master cards.

(Please add $1.50 for shipping and handling - Thank you.)

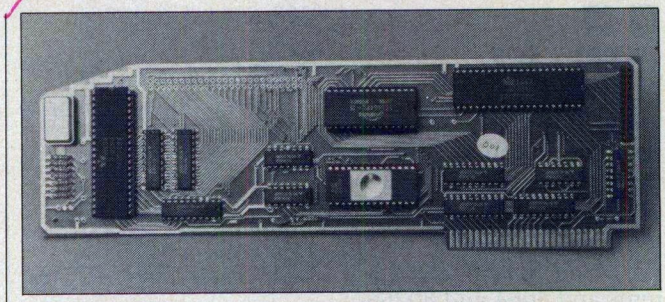
VISA MasterCard

SOFT BYTE

SOFT-BYTE
P.O. Box 556 Forest Pk.
Dayton, Ohio 45405

CIRCLE 200 ON READER SERVICE CARD

Pipeline



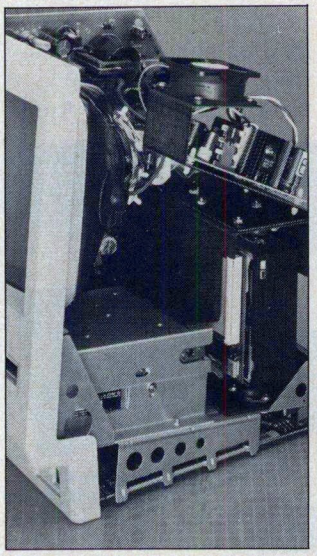
The VIP Card can work as a stand-alone controller or as a peripheral card for Apple II computers.

II expansion slot. *(List Price: $129)*
Requires: Apple II, II Plus, or IIe
Bukowski Robotics Company
1555 West University
Suite 105
Tempe, AZ 85281
~~(602) 967-6967~~
CIRCLE READER SERVICE NO. **507**

MAC

MAGNET 20 HARD-DISK DRIVE

Designed for the Macintosh Plus, the MagNet 20 is a single-user, 20-megabyte, hard-disk drive that also provides built-in multiuser multitasking. The drive includes an internally mounted, three-chip SCSI board; a disk cache; a backup utility for incremental backup or mirror-image backup; print spooling; partition volumes; password protection; and a proprietary head-lifter mechanism. It can be connected to up to 32 Macintoshes and comes with a special version of Infosphere's MacServe. *(List Price: $1495)*
Requires: Macintosh, 512K RAM
Mirror Technologies
2209 Phelps Road
P.O. Box 304
Hugo, MN 55038
(612) 426-3276
CIRCLE READER SERVICE NO. **508**

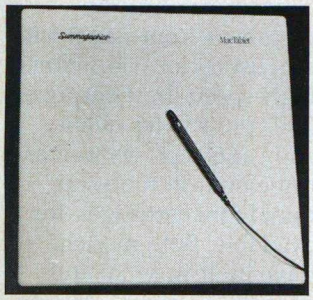


The MagNet 20 is a multiuser, internal hard-disk drive for the Macintosh.

MAC

MACTABLET

Summagraphics Corporation has released a new version of its graphics tablet MacTablet. The new tablet provides an active work area of 12 × 12 inches. The tablet connects to the computer's modem or printer port and has a tilt mechanism so that users can adjust it to a comfortable position. Users can produce artwork freehand or can trace drawings through material up to ½-inch thick. The tablet comes with new Version 3.0 software that lets users shrink or enlarge drawings; it also offers a Viewport feature with



Summagraphics' MacTablet

which users can control the size and location of the tablet's active area. *(List Price: $549)*

Requires: Macintosh

Summagraphics Corporation
777 State Street Extension
Fairfield, CT 06430
(203) 384-1344

CIRCLE READER SERVICE NO. **509**

II SERIES

TRANSWARP ACCELERATOR CARD

The Transwarp, an accelerator card that speeds up both the main and auxiliary memory of an Apple II computer, is now available from Applied Engineering. The card enables software to run up to three and a half times faster, works with all Apple II Plus and IIe software, and is compatible with all standard peripheral cards. To disable it, users can press the Escape key. *(List Price: $279)*

Requires: Apple II, II Plus, or IIe

Applied Engineering
P.O. Box 798
Carrollton, TX 75006
(214) 241-6060

CIRCLE READER SERVICE NO. **510**

II SERIES MAC

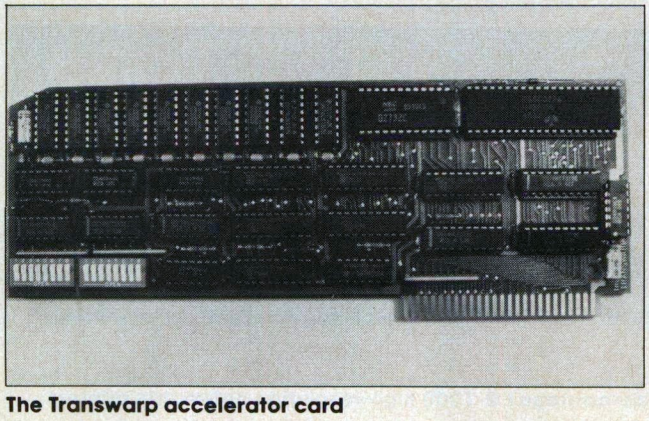
SP-1000 SERIES PRINTERS

Hattori Seiko Computer Peripherals has introduced the SP-1000 series of dot matrix printers. The SP-1000AS offers a standard RS-232 serial interface, the SP-1000AP is compatible with Apple IIc and Macintosh computers, and the SP-1000A has a non-computer-specific character set that makes it compatible with a variety of computers. All SP-1000 printers feature standard items such as bidirectional printing with logic seeking, adjustable tractor and friction feed, a variety of print character sets, automatic paper loading, and right/left margin-set functions. *(List Price: $299 each)*

Requires: Apple IIe, IIc, or Macintosh

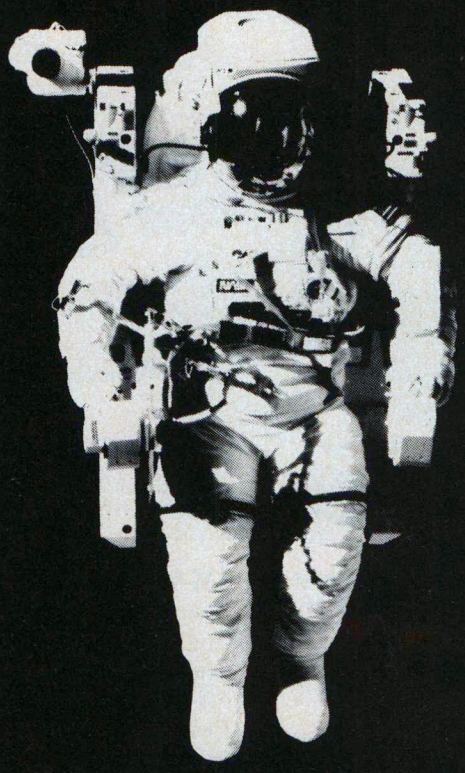
Hattori Seiko Computer Peripherals
1111 Macarthur Blvd.
Mahwah, NJ 07430
(201) 529-5730

CIRCLE READER SERVICE NO. **511**



The Transwarp accelerator card

TRY THIS ON FOR SIZE.



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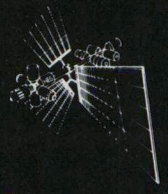
PROJECT SPACE STATION



Our space station construction software, can get you to Space Camp for the time of your life. You'll need to get your hands on it and build us your best station.

We'd like to see you in this suit. Soon. See your favorite software dealer for a Space Camp Scholarship booklet and construction guidelines, or write to us at the address below.

HesWare

P.O. Box 631-SCS
So. San Francisco, CA 94080
(415) 871-0570

CIRCLE 147 ON READER SERVICE CARD

Finger Print LetterWriter is an upgrade kit that enables Epson FX printers to produce near-letter quality print.

II SERIES MAC

FINGER PRINT LETTERWRITER NLQ UPGRADE KIT

An upgrade kit that provides users of Epson FX printers with near-letter-quality (NLQ) print is now available. Finger Print LetterWriter is a kit of replacement ROMs that plugs into original and + series FX-80 and FX-100 printers. With the NLQ upgrade kit, users can select the NLQ mode either via software or from the printer panel's buttons. In the Apple mode, the FX printer can accept graphics and control codes in the Apple printer format for use with Macintosh or Apple IIc programs such as MousePaint. *(List Price: $79.95)*

Requires: Apple IIc or Macintosh

Dresselhaus Computer Products
837 East Alosta Avenue
Glendora, CA 91740
(818) 914-5831

CIRCLE READER SERVICE NO. **592**

IMAGEWARE

Two products in a new line of ImageWriter II peripherals called ImageWare are now available from Orange Micro. ImageMate is an intelligent module that fits inside the ImageWriter II and provides compatibility with most non-Apple computers. The module also offers a standard print buffer of 64K, expandable to 128K. The buffer contains Copy and Clear features for greater flexibility when you print documents.

Designed for Apple computers, the ImageBuffer also installs inside the ImageWriter printer. The board offers all the buffering features of ImageMate, and the buffer commands can be disabled easily with an onboard switch. *(List Price: ImageMate, $129; ImageBuffer, $99)*

Requires: ImageWriter II

Orange Micro, Inc.
1400 N. Lakeview Avenue
Anaheim, CA 92807
(714) 779-2772

CIRCLE READER SERVICE NO. **593**

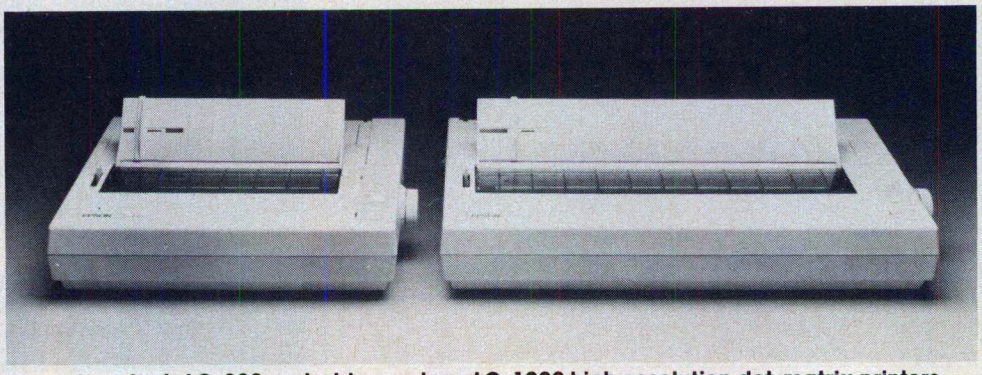
EPSON LQ-800, LQ-1000 PRINTERS

Epson America has introduced two new dot-matrix printers—the 80-column LQ-800 and the 136-column LQ-1000—featuring a special 24-pin printhead that can create high-resolution characters in a single pass. The printers also offer logic-seeking bidirectional printing, 96 ASCII and 13 international character sets, and proportional-space printing. By pressing a front-panel button, users can select either high-speed draft output at 180 cps or letter-quality copy at 60 cps. As well as three built-in fonts, optional font cartridges are available. Both models have built-in serial and parallel interfaces, friction paper feed, and a 7K buffer; optional tractor and cut-sheet feeders are also available. *(List Price: LQ-800, $799; LQ-800 tractor feeder, $49.95; LQ-800 cut-sheet feeder, $129.95; LQ-1000, $995; LQ-1000 tractor feeder, $59.95; LQ-1000 cut-sheet feeder, $169.95)*

Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(800) 421-5426
in CA (213) 539-9140

CIRCLE READER SERVICE NO. **594**

The ImageMate module lets non-Apple computers work with the ImageWriter II.



Epson America's LQ-800 and wide-carriage LQ-1000 high-resolution dot-matrix printers

ACCESSORIES

ERGOTRON PEDESTAL BASE

The Ergotron Pedestal Base is designed specifically for Apple's IIc Color Monitor. The base elevates the monitor by approximately four inches and provides variable vertical and horizontal adjustment of the viewing screen to minimize glare and to ease eye, neck, and back strain. Its metal top plate eliminates any RFI interference or disk problems associated with using the IIc and the monitor. *(List Price: $89.95; volume discount available)*

Requires: Apple IIc Color Monitor

Ergotron, Inc.
1621 East 79th Street
Suite C-133
Minneapolis, MN 55420
(800) 328-9839
In MN (612) 854-9116

CIRCLE READER SERVICE NO. **512**

DATASAFE CABLES

Monster Cable's new line of high-precision computer cables, the DataSafe Series, consists of ten quality cables that can connect all popular computers to printers and modems. The cables have heavy shielding made of dual-sided mylar foil and high-density braids; they are color-coordinated to complement all Apple models. Each cable terminates with the firm's custom-designed DB-9, DB-25, or 90° Centronics hoods. *(List Price: $40–$60)*

Monster Cable
101 Townsend Street
San Francisco, CA 94107
(415) 777-1355

CIRCLE READER SERVICE NO. **513**

PLOTTER PEN ADAPTER

L.J. Stafy Design Services' plotter-pen adapter is designed to mate Pentel plotter pens with Houston Instrument DMP series plotters; it also works with plotters from various other manufacturers. The adapter, which is made of black Delrin plastic and comes with an Allen wrench, works with both ceramic-tip and roller-tip pens. Pens are available from other suppliers in various sizes and are packaged as disposable sealed units. They can maintain a uniform line width at plotting speeds of 10 to 14 inches per second. *(List Price: $6.49)*

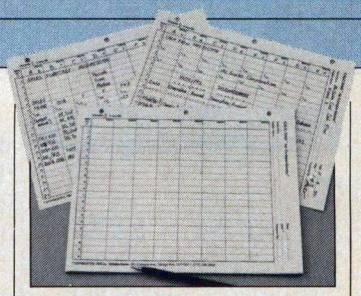
Requires: Pental plotter pen, plotter

L.J. Stafy Design Services
1439 Virmay Drive
Gilbertsville, PA 19525
(215) 341-6438
eves. (215) 367-7052

CIRCLE READER SERVICE NO. **514**

CALC/PAD

Designed for executives who wish to pass on template designs to subordinates who develop actual spreadsheets at the key-



The CALC/PAD spreadsheet organizer pad

board, CALC/PAD is a spreadsheet organizer pad that provides a series of columns and rows in which users can write exact templates specifications. Each CALC/PAD consists of 50 individual layout forms produced on erasable green paper that has holes punched for placement in a three-ring binder. Each form has 20 rows and 8 columns, providing spaces for penciling in required text, values, and formulas. *(List Price: $5.95)*

COMPU-QUOTE
6914 Berquist Avenue
Canoga Park, CA 91307
(818) 348-3662

CIRCLE READER SERVICE NO. **515**

Zimco International

85-39 213th Street, Queens Village, NY 11427

(800) 227-6647
NY Call (718) 479-7888

DRIVES

Bernoulli Box (Mac)	$1450
Corvus Hard Drive	call
Disk Drive — One Year Warranty	$ 155
Disk Drive Controller (Apple)	$ 30
Habba (Mac)	$ 279
Quark 10 Meg Hard Drive (Apple)	**$ 999**
Quark 20 Meg Hard Drive (Apple)	$1350
Tymac 3.5" Drive	$279

PRINTERS:

Brother HR-15	$335
Citizen 120D	$179
Citizen MSP 10	$240
Daisywriter 2000	$735
Epson FX-85	$359
Epson LX-90 w/pic	$245
Epson 286	$499
Epson AP-80	$280
NEC Pinwriter P2*	$425
Okimate 20*	$125
Okidata 192p	$339
Okidata 193	$455
Qume Letter Pro 20	$430
Qume Sprint 1400*	$899
Panasonic KXP-1091	$229
Panasonic KXP-1092	$330
Panasonic KXP-1592	$460
Silver Reed EXP-800	$649
Star SG-10	$219

*requires interface

SUPPLIES:

Centronics Parallel Cable	$21
Disk Notcher	$ 5
Laser Edge 20 lb. Paper (1000)	$19
Maxell MDI	$15
Maxell MDII	$19
RS232 Cable	$21
64K Chips (8)	$14

SOFTWARE

Beagle Bros. Mini-Pix Disk #1	$17
Fontrix	$59
Graphics Department	$66
Newsroom	$33
Newsroom Clip Art Collection	$16
Print Shop	$28
Print Shop Graphics Libraries	$15
Print Shop Companion	$23
Sensible Grammer	$52
Sensible Speller Pro-Dos	$66
Typing Tutor III	$31

MONITORS

Amdek 300 Green	$116
Amdek 310 IBM Amber	$142
Amdek 600 Color RGB	$375
Amdek 722 Color	$489
NEC Amber	**$ 89**
Panasonic DTH-103	$389
Princeton HX-12 RGB	$430
Princeton MAX-12 Amber	$168
Sakata SC-100 Color	$149

Applied Eng. Ram Works II 512k
$199
Half Height Disk Drive
Apple II Series
$125

MODEMS

Anchor Express 300/1200	$239
Anchor Volksmodem 300	$ 49
Hayes Micromodem IIe	$128
Hayes Smartmodem 300 (IIc)	$152
Hayes Smartmodem 1200	$359
Hayes Smartmodem 1200B	$325
Hayes 2400	$559
Novation Applecat II	$187
Novation Applecat 212 system	$353
Novation Applecat 212 upgrade	$214
Prometheus Pro-Modem	$290
Prometheus Pro-Modem 1200A	$265
1200 Baud (Hayes)	$250
U.S. Robotics 1200	$235
U.S. Robotics 2400	$440

APPLE ACCESSORIES:

A+ Mouse (IIc. Mac)	$ 65
Appliend Eng. Music Synthesizer	$120
Applied Eng. Ram Works II 256k	$189
Applied Eng. Ram Works 1 meg	call
Applied Eng. RGB Option	$ 99
Applied Eng. Timemaster	$ 95
Applied Eng. Viewmaster	$ 95
Applied Eng. ZRAM w/512k	$349
AST Multi I/O (IIe)	$149
CH Mach III Joystick	$ 33
Coolingfan	$ 24
80 Column Card (II+)	$ 60
80 Column Card w/Softswitch	$70
Ext. 80 Column Card (64k, //e)	$ 59
Graphics Printer Card	$ 55
Pico Joystick	$ 25
Kensington System Saver	$ 59
Koala Pad Plus	$ 78
Kraft Joystick	$ 33
Mockingboard A,B,C,D	call
O.M. Bufferboard for Grappler+	$ 60
O.M. Grappler +	$ 73
O.M. Grappler +, Buffered	$133
O.M. Grappler +, Serial	$ 73
O.M. Grappler +, IIc	$ 79
O.M. Hotlink	$ 45
Power Strip	$ 12
Printer Interface Parallel	$ 40
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16k Ram Card	$ 35
Super Serial Card	$ 69
Thunderclock	$104
Video7 Slot 7	$100

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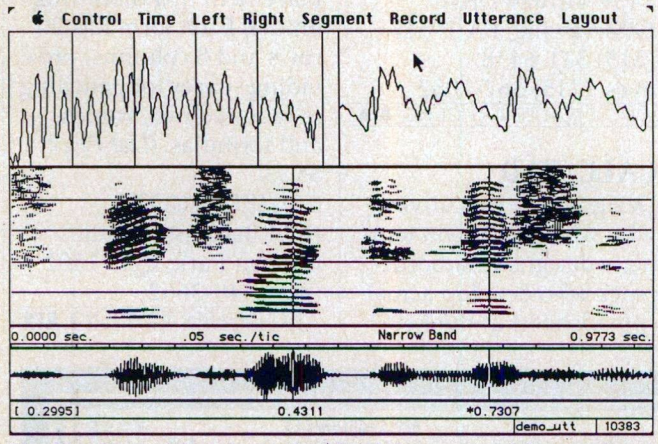
HARD/SOFTWARE

MAC

MACSPEECH LAB

The latest addition to GW Instruments' MacADIOS product line, MacSpeech Lab turns the Macintosh computer into a powerful speech-analysis workstation for studying human speech and testing the speech impaired. The workstation and components consist of MacSpeech Lab software, MacADIOS hardware, and a Macintosh computer.

MacADIOS System I hardware is a complete hardware and software data-acquisition system that features four 12-bit analog voltage outputs, eight 12-bit analog voltage inputs, 16 digital inputs, 16 digital outputs, a timer, and a programmable clock. Software that comes with the unit includes 5 Instruments, MacADIOS Manager, XY MaCorder, 53 compiled functions for easy control from Microsoft BASIC or Manx Aztec C, calibration and hardware test programs, and example BASIC programs.



The MacSpeech Lab turns the Mac into a powerful speech-analysis workstation for studying and testing human speech.

When used with MacSpeech Lab software, the MacADIOS hardware records words and phrases digitally at sample rates up to 20,000 samples per second. Users can use the mouse to select time and frequency representations of speech at different positions. They can also amplify, offset, normalize, save to disk, delete, play, and zero in on segments within utterances. The system produces sound spectrograms that show the progression of frequency spectra with time and draws pitch plots to show the variation of fundamental frequency within an utterance. *(List Price: MacADIOS, $2500; MacSpeech Lab software, $300; demo disk, $10)*

Requires: Macintosh

GW Instruments
P.O. Box 547
Cambridge, MA 02142
(617) 577-1524

CIRCLE READER SERVICE NO. **516**

INTERBRIDGE

InterBridge provides both local and remote bridge capabilities for expanding AppleTalk networks. Using the bridge, an AppleTalk-compatible computer on one network can access other AppleTalk-compatible computers, fileservers, LaserWriter printers, and other output devices on another network. As a local bridge, the product can link two closely located AppleTalk networks; as a remote bridge, two networks, each equipped with an InterBridge and a Hayes Smartmodem 2400, can access each other through either dial-up or leased telephone lines. The product can handle one local bridge and two remote bridges simultaneously.

Also provided with each unit is the InterBridge Manager Software, which provides a variety of configuration and management options so that users can tailor InterBridge to fit their needs. *(List Price: $799)*

Requires: AppleTalk

Hayes Microcomputer Products, Inc.
P.O. Box 105203
Atlanta, GA 30348
(404) 441-1617

CIRCLE READER SERVICE NO. **517**

Macintosh Aficionados

A+ would appreciate receiving any tips, hints, shortcuts, or suggestions that you have for using the Macintosh computer. We would like to publish these pearls in our MacTips feature in our Macintosh section. You'll receive credit in the magazine, and we'll pay $50 for each MacTip that we use. Send your tips to:

MacTips
A+ Magazine
ATTN: Chip Carman
11 Davis Drive
Belmont, CA 94002

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4Z346

SOFTWARE

KEYBOARD CONTROLLER SEQUENCER

The Keyboard Controller Sequencer is designed to run on unexpanded computers using a Passport-compatible MIDI interface and supports the Passport sync-to-tape facility. The program enables users to operate their system as a 16-track tape recorder capable of recording and playing back on any or all of the 16 MIDI channels. It includes a complete editing system and a flexible set of options for structuring music. Users can record sequences in real time from the synthesizer keyboard, can enter sequences one at a time from the computer keyboard, or can enter sequences of evenly spaced notes from the synthesizer keyboard using the Step-Time feature. Other features include the abilities to merge and print sequences and to move, copy, transpose, invert, auto-correct, and time-reverse part or all of any sequences. *(List Price: $175)*

Requires: Apple II Plus or IIe, Passport-compatible interface

Dr. T's Music Software
66 Louise Road
Chestnut Hill, MA 02167
(617) 244-6954

CIRCLE READER SERVICE NO. **518**

FOSCIL FDOS

A disk-operating system for Apple IIe and IIc computers, FDOS provides five extra tracks for each disk made in its format and gives users 20K of the upper 64K on a 128K system. The program is easy-to-use and comes with a BASIC interpreter. It works with DOS 3.3 commands and has a setup similar to that of MS-DOS. *(List Price: $29.95)*

Requires: Apple IIe or IIc, 128K RAM, 80-column display, Mousetext

Foscil Labs/DataCom Media
406 East 73rd Street
New York, NY 10021

CIRCLE READER SERVICE NO. **519**

COMMWORKS

Compatible with most modems for Apple II computers, CommWorks is a telecommunications software package that has an AppleWorks-type interface with on-line help. To make the software easy to use, it incorporates four special features: CommWorks Communications Files, which allow users to define and save often-used communications parameters and commands for terminal sessions; an Automatic Log-on facility, which lets users define a set of macros that they can instruct CommWorks to execute by using a single keystroke; CommWorks Macros, which allow users to define up to 18 separate sets of macros and keep them in a library; and CommWorks Text Editors, with which users can create or modify their ProDOS documents. *(List Price: $95)*

Requires: Apple IIe or IIc, ProDOS, modem

PBI Software, Inc.
1111 Triton Drive
Foster City, CA 94404
(415) 349-8675

CIRCLE READER SERVICE NO. **520**

BEACH-HEAD GAMES

Beach-Head, an action/strategy game, and its sequel Beach-Head II are now available in versions for Apple computers.

Beach-Head's setting is a war scenario in which players move through torpedo-infested waters and take part in a full-scale air assault, sea battle, and land invasion over an obstacle-laden beach. In the final conflict at the fortress of Khun Lin, players must eliminate ten gun turrets while being bombarded by enemy mortar.

Designed for one or two players, the games feature high-resolution graphics, sound effects, and multiple scrolling screens. Beach-Head II, subtitled The Dictator Strikes Back, also features rotoscopic animation techniques. Both games have a Demonstration mode that allows players to practice individual phases of the games and offer the ability to save high scores to disk. *(List Price: $34.95 each)*

Requires: Apple II Plus, IIe, or IIc, 48K RAM; one disk drive

Access Software, Inc.
2561 S. 1560 West
Woods Cross, UT 84087
(801) 298-9077

CIRCLE READER SERVICE NO. **590**

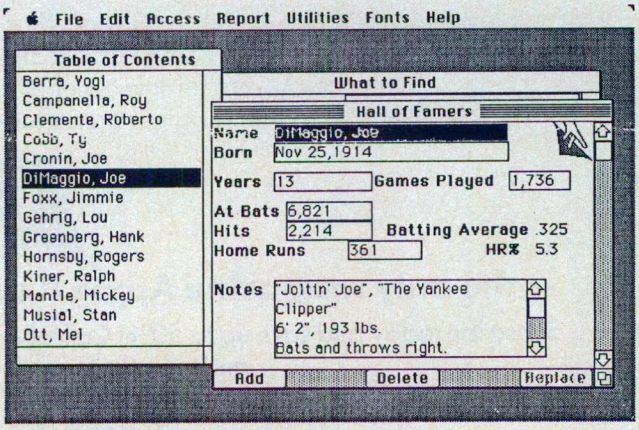
RECORD HOLDER

Record Holder is a full-function data-management system for Macintosh computers. All data fields are variable in length, with field size limited only by computer memory space. Besides text fields, the software allows numeric, date, money, statistical and computed fields. Other features of Record Holder include a separate Table of Contents window that lists all records in a file, form-oriented Display and Report functions, and a Preview function that enables you to view reports on-screen before you print them. Reports can be up to 16 inches wide and can include page headers and summary statistics. In addition, the number of sort levels for reporting is unlimited. *(List Price: $49.95)*

Requires: Macintosh

Software Discoveries, Inc.
99 Crestwood Road
Tolland, CN 06084
(203) 872-1024

CIRCLE READER SERVICE NO. **591**



A sample screen from Record Holder

MAC

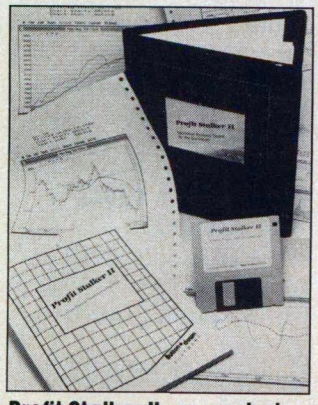
PROFIT STALKER II

Profit Stalker II is an enlarged and revised version of a technical analysis program designed for personal investors, traders, and brokers. The program provides Macintosh users with integrated database, charting, and terminal-emulation features that they can use to analyze and chart the movement of stock and commodity prices. With a modem and a subscription to an online database service, users can download price data directly into Profit Stalker's database. Charting tools include daily bar charts, volume, open interest, on-balance volume, moving averages, relative strength, oscillators, momentum, accumulation-distribution, and point-and-figure charts. Users can set many of the chart parameters and can also track spreads and draw trend lines. *(List Price: $250)*

Requires: Macintosh, 512K RAM

Button•down Software
P.O. Box 19493
San Diego, CA 92119
(619) 463-7474

CIRCLE READER SERVICE NO. **521**



Profit Stalker II, an analysis program for stock or commodities traders

MAC

MACPALETTE

MacPalette allows users to produce full-color text and graphics when they use a Macintosh computer with the ImageWriter II. Users can design an almost infinite number of color patterns that they can assign to any selected area of a drawing. A Text Color option gives a choice of 32 type styles that can be printed in any one of the seven basic colors. *(List Price: $69)*

Requires: Macintosh, ImageWriter II

Microspot
9 High Street
Lenham, Maidstone
Kent ME17 2QD, England
(0622) 858753

CIRCLE READER SERVICE NO. **522**

MAC

MACSPEC

MacSpec is a specialized word processor/editor for the development of specifications, proposals, and technical papers. As well as having standard word-processing features, MacSpec performs the following functions automatically—section numbering, section indentation, and production of tables of contents with section page numbers. It can also produce a new table of contents when users move sections and can automatically generate new section numbers when sections are cut and pasted. *(List Price: $199.95)*

Requires: Macintosh or Macintosh Plus

LM Software
P.O. Box 93
Belmont, CA 94002-0093
(415) 594-0627

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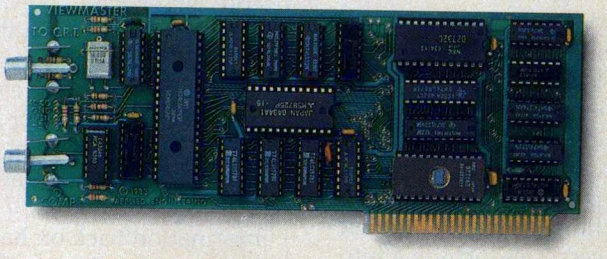

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WIZARD 80					✓		✓	✓	
VISION 80	✓	✓			✓				
OMNIVISION		✓					✓	✓	
VIEWMAX 80	✓	✓			✓			✓	
SMARTERM	✓	✓				✓	✓		
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Æ Applied Engineering
P.O. Box 798, Carrollton, TX 75006
(214) 241-6060

Pipeline

II SERIES

FINGERTIPS

Fingertips is a collection of desktop accessories that work under DOS or ProDOS on Apple II computers. The package can either be used on its own, or it can run behind other programs on 128K IIe or IIc systems. Desktop accessories include a full-function business, scientific, and programmers' calculator; calendar; appointment planner; notepad; card file; phone directory; telecommunications package; and instant access to DOS or ProDOS. Additional features include the ability to print any function and any of the user's screen.

Also available is Programmer's Fingertips, a collection of utilities, charts, and tools designed for programmers. As well as having the Fingertips notepad, calendar, and calculator, this package includes a screen-dump utility, Applesoft tools, machine-language tools, disk tools, and a hexadecimal calculator. *(List Price: $39.95 each)*

Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; DOS or ProDOS

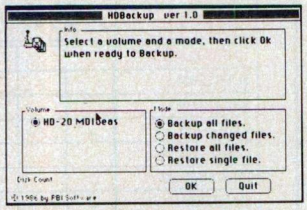
Fingertips
830 N. Riverside Drive
Suite 201
Renton, WA 98055
(800) 628-2828, ext. 543
(206) 226-3216

CIRCLE READER SERVICE NO. **527**

MAC

HD BACK-UP

Designed for Macintosh computers, HD Back-Up is a backup utility that can copy all data from hard-disk drives and other peripherals to floppy disks. The utility has four options: Global, Incremental, Restore All Files, and Restore Single File. The Global option restores all files to sets of disks. The Incremental option copies everything changed after a global change. The Restore All Files option enables users to put all information back on hard disks, and the Restore Single File option copies a single file from a backup disk to a hard disk. The program also has a Disk Count gauge that tells users how many floppy disks they will need in order to make a global backup. *(List Price: $49.95)*



A screen from HD BACKUP

Requires: Macintosh, or Macintosh XL under MacWorks

PBI Software, Inc.
1111 Triton Drive
Foster City, CA 94404
(415) 379-8765

CIRCLE READER SERVICE NO. **528**

MAC

MACSAFE

Macintosh users can protect files from casual scrutiny by placing them in a password-protected safe area of a disk by using MacSafe, a new product from Kent Marsh Ltd. Each safe area on a disk also has a secret compartment for especially sensitive files, providing an extra level of protection. MacSafe also allows users to encrypt files using the American National Standard for Data Encryption. Because this standard is used by the U.S. Government, MacSafe cannot be exported, but an international version will be available soon. *(List Price: $69.95)*

Requires: Macintosh

Kent Marsh Ltd., Inc.
1200 Post Oak Blvd.
Suite 210
Houston, TX 77056
(713) 623-8618

CIRCLE READER SERVICE NO. **529**

II SERIES MAC

MINDSCAPE SOFTWARE

Four new software products are available from Mindscape. Developed in cooperation with Dr. Max Luscher, author of the book *The Luscher Color Test*, The Luscher Profile helps users reveal their true personality by drawing psychological profiles based on their reactions to colors and shapes. In The American Challenge: A Sailing Simulation, one or two players compete with the top eight American sailors to win a trip to Perth, Australia, where the next America's Cup race will be held in 1987.

The other two programs are interactive text adventure games. Based on the book by Dick Francis, Dick Francis' High Stakes puts the player in the role of a wealthy English racehorse owner who must foil a sinister plot and in the process gambles money, reputation, and life. In James Bond 007 Goldfinger, the player must prevent a scheme that threatens Fort Knox and the entire U.S. economy. *(List Price: $39.95 each)*

Requires: Apple II, II Plus, IIe, or IIc; 64K RAM; James Bond also Macintosh, 512K RAM

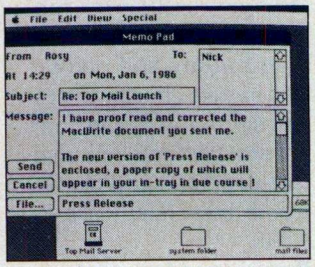
Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667

CIRCLE READER SERVICE NO. **530**

MAC

TOPMAIL

TopMail is an electronic-mail service that operates as a desk accessory that can work alongside any Macintosh application. Not limited to one-to-one message handling, TopMail can dispatch any length of message to any number of AppleTalk network users at one time. Once a message has been sent, the receiver is alerted automatically. If the receiver has logged off, the mail server stores the message and dispatches it as soon as the receiver logs back on. The package uses no special commands and is thus easy to use. *(List Price: $250)*



A sample screen from TopMail

Requires: Macintosh, AppleTalk

Icon Review
P.O. Box 2566
Monterey, CA 93942
(800) 824-8175
In CA (800) 228-8910 or
Topexpress Ltd.
13/14 Round Church Street
Cambridge CB5 8AD
England
(0223 355427)

CIRCLE READER SERVICE NO. **531**

MAC

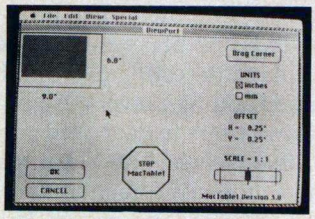
MACTABLET SOFTWARE, VERSION 3.0

Summagraphics Corporation is now shipping Version 3.0 software with its MacTablet graphics tablet for the Macintosh. The new software lets users shrink or enlarge drawings, scaling them down from the 1:1 ratio to a 1:0.5 ratio or up to a 1:1.15 ratio, as they are traced for input into the computer. The software also has a Viewport feature that allows users to control the size and location of the tablet's active area. The MacTablet is compatible with all Macintosh software and connects to the computer's modem or printer port. Version 3.0 is free for all current MacTablet owners.

Requires: Macintosh, MacTablet

Summagraphics Corporation
777 State Street Extension
Fairfield, CT 06430
(203) 384-1344

CIRCLE READER SERVICE NO. **524**



A screen from MacTablet Version 3.0 software

II SERIES

BIO*CELL

Intended for anyone in seventh grade and up who is interested in biology, Bio*Cell presents an introduction to the biology of cells. The easy-to-use program illustrates the major cell structures for plants and animals; explains the function of each organelle, and provides a survey of the various types of cells that make up plants and animals. Other features include testing of students' knowledge of cell structure; an introduction to genetics and the structure of DNA and how it codes genetic information; and an on-screen glossary of biological terms relating to cells. *(List Price: $29.95)*

Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive

Zephyr Services
306 South Homewood Avenue
Pittsburgh, PA 15208
(412) 247-5915

CIRCLE READER SERVICE NO. **525**

MAC

STRU-PLAN

The Stru-Plan Steel Design Package is an interactive design tool for structural engineers. The package provides a set of Multiplan templates that assist in the design of the major structural elements of steel buildings. Available templates are Beams, Columns, Footings, Baseplates, Slabs & Girts, Basement Walls, and Roof and Floor Joists. The package also has forms for estimating construction costs and standard guide specifications. Output is in the format of 8½ × 11-inch calculation sheets that include all information necessary to document designs. *(List Price: $349)*

Requires: Macintosh, 128K RAM, one disk drive, Multiplan, MacWrite

Benchmark Software, Inc.
824 Cotswold Road
Somerdale, NJ 08083
(609) 784-6070

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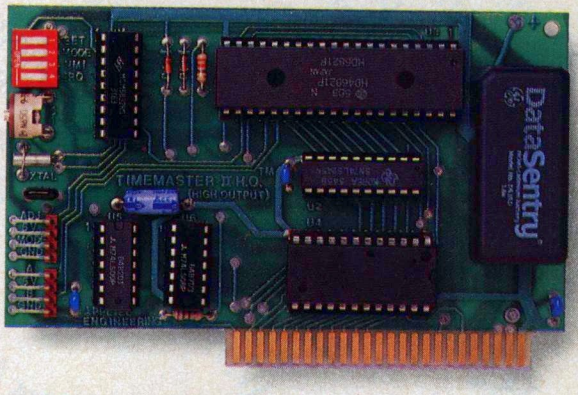
Timemaster H.O.™, the only clock that displays time and date on AppleWorks'™ screens and files.



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It's the smart way to put the time and date on your Apple II+® or IIe®. Because only the Timemaster H.O. packs *ALL* the features of all the competition *combined,* including leap year, year (not just in PRO-DOS), month, date, day of week, hours, minutes, seconds and milliseconds. It's totally PRO-DOS, DOS 3.3, PASCAL and CP/M compatible. And of course, it works better than any other clock with AppleWorks.

If you're using or writing software for other clock cards, you're still covered. Because the H.O. will *automatically* emulate them. And the Timemaster H.O. adds 14 new commands to BASIC. The H.O. even comes complete with two disks full of sample programs, including a computerized appointment book, a DOS dating program, interrupt programs, and over 30 programs that others charge extra for — or don't even offer.

As a low-cost option, you can add true BSR remote control to the H.O., giving you remote control of up to 16 lights and appliances in your home or office.

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Clock price **$129.00**
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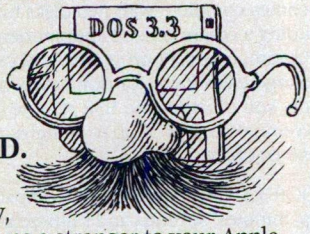

Until now, DOS 3.3 was a stranger to your Apple UniDisk 3.5. But no more!

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(713) 526-5706, Telex: 4945935

Money Back Guarantee. VISA and MC accepted. UniDOS is written by David Hemmo and Marc Moini. **For Macintosh Owners:** Meacom also offers Mac + II, an AppleIIe emulator (128k, 80 column) for your 512k Mac or MacPlus. UniDisk 3.5 and Macintosh are trademarks of Apple Computer, Inc. UniDOS is a trademark of Meacom.

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It is not possible in an ad to really explain this Apple II (e or c) product which outperforms all other software in speed and simplicity. It does no-frills word processing, information retrieval, telecommunications and many other tasks. Reviewers call it "foolproof and frustration free" and "blindingly fast." It appeals to beginners and experts. Jef Raskin, who invented the Macintosh and who later created SwyftWare, has written up the hows and whys of this product. Please write for a copy. No charge. Or order SwyftWare and see for yourself. At $89.95 and with a 30-day refund policy, there's no risk.

US 800/982-5600
CA 800/562-7400

Information Appliance
1014 Hamilton Ct., Menlo Park, CA 94025

Pipeline

MAC

MACPROOF, VERSION 1.1

Version 1.1 of Automated Language Processing (A.L.P.) Systems' MacProof writing-assistance software is now available. Designed to complement college-freshman composition courses, MacProof gives students immediate feedback on their writing habits, letting them review spelling, word usage, use of verbs, and the organization and structure of their composition.

Version 1.1 enhancements include support for Microsoft Word and MacWrite, Version 4.5. The program comes with Finder, Version 4.1, and uses Version 3.2 of AppleTalk. MacProof is designed to run in a Writing Lab setting comprising 2–15 individual Macintosh workstations linked through an AppleTalk network.

Requires: Macintosh, 512K RAM, AppleTalk

Automated Language Processing (A.L.P.) Systems, Inc.
190 West 800 North
Provo, UT 84604
(801) 375-0090

CIRCLE READER SERVICE NO. **532**

MAC

BRIDGE 4.0

A version of Artworx's bridge-playing program Bridge 4.0 is now available for Macintosh computers. The program both bids and plays and enables users to replay interesting deals and switch hands among players. A new feature allows users to deal only good hands for themselves. The Macintosh version takes full advantage of the computer's graphics and mouse. It displays cards just as they would appear on a real bridge table, and users can make bids and card selections by pointing and clicking the mouse. *(List Price: $29.95)*

Requires: Macintosh

Artworx Software Company, Inc.
150 North Main Street
Fairport, NY 14450
(800) 828-6573
(716) 425-2833

CIRCLE READER SERVICE NO. **534**

MAC

HYPERNET FILESERVER SOFTWARE

General Computer has introduced HyperNet, fileserver software that lets users share hard-disk storage capacity, files, and programs among up to 32 Macintosh computers linked through an AppleTalk network. Each copy of HyperNet includes a host program that users can install on a Macintosh equipped with one of the company's HyperDrive internal hard-disk drives. Network users can make unlimited copies of an accompanying client program for other Macintosh computers on the network. *(List Price: $295)*
Requires: Macintosh
General Computer Corporation
215 First Street
Cambridge, MA 02142
(617) 492-5500
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II SERIES

PROPORTIONS IN GEOMETRY

The first in a line of four tutorial-level high-school math packages, Proportions in Geometry covers such topics as basic definitions and theorems, lines parallel to sides of triangles, proportions in similar triangles, mean proportions in a right angle, and proportions in a circle. The software follows New York State Core-Curricula guidelines and is useful for remediation, review, and extra-credit work. The product places emphasis on problem-solving strategies rather than actual answers to problems and offers teachers diagnostic data and the ability to print hard copy. *(List Price: $169)*
Requires: Apple II, 48K RAM
Bergwall Educational Software, Inc.
106 Charles Lindbergh Blvd.
Uniondale, NY 11553-3695
(800) 645-1737
in NY (516) 222-1111
CIRCLE READER SERVICE NO. **536**

BOOKS

THE LOGO PROJECT BOOK: EXPLORING WORDS AND LISTS

Written by Alison Birch, *The Logo Project Book: Exploring Words and Lists* uses Logo as a tool to explore ideas about language, patterns, and mathematics. Although intended for childrens' use, the book is also appropriate for adults who want to learn about Logo's list-processing abilities. The book includes several projects and suggestions for modifications at different levels.

It also has an extensive glossary of Logo primitives and several appendices that discuss such topics as procedures that output, predicates, local and global variables, programming style, debugging, and tool procedures. It comes with an activities disk full of sample projects. *(List Price: $19.95)*
Requires: Apple II, II Plus, IIe, or IIc; 64K RAM; Apple Logo
Terrapin, Inc.
222 Third Street
Cambridge, MA 02142
(617) 492-8816
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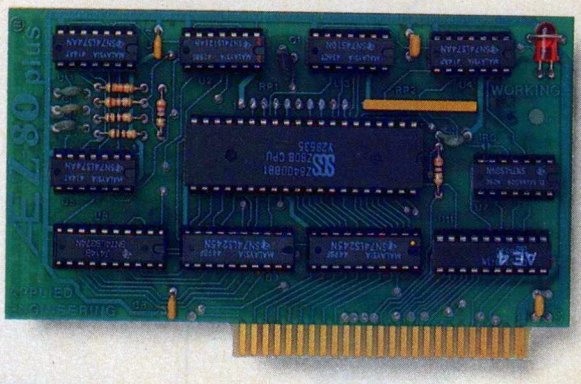

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Enter the CP/M world with the new Z-80 Plus card from Applied Engineering, and introduce your Apple IIe® or II+® to the thousands of CP/M programs. Only the Z-80 Plus comes standard with the new 4.0 software, the most advanced system ever for running CP/M programs.

The new 4.0 boasts advanced features like built-in disk emulation for popular memory expansion boards, boosting both system speed and storage capacity. And menu-driven utilities that let you get to work faster. The Z-80 Plus also lets you run older CP/M programs — all the way down to Version 1.6 (2.2 is the most popular).

The Z-80 Plus is the only card on the market capable of accessing more than 64K in an Apple IIe. If you have an extended 80-column card, all 128K is usable, and if you have RamWorks, up to 1088K is available.

Each Z-80 Plus comes with our CP/M Ram Drive software, enabling IIe owners to use an extended 80-column card or a RamWorks card as a high-speed Ram disk which runs CP/M software up to *twenty times faster.* So packages like WordStar and dBASE II run at blinding speed.

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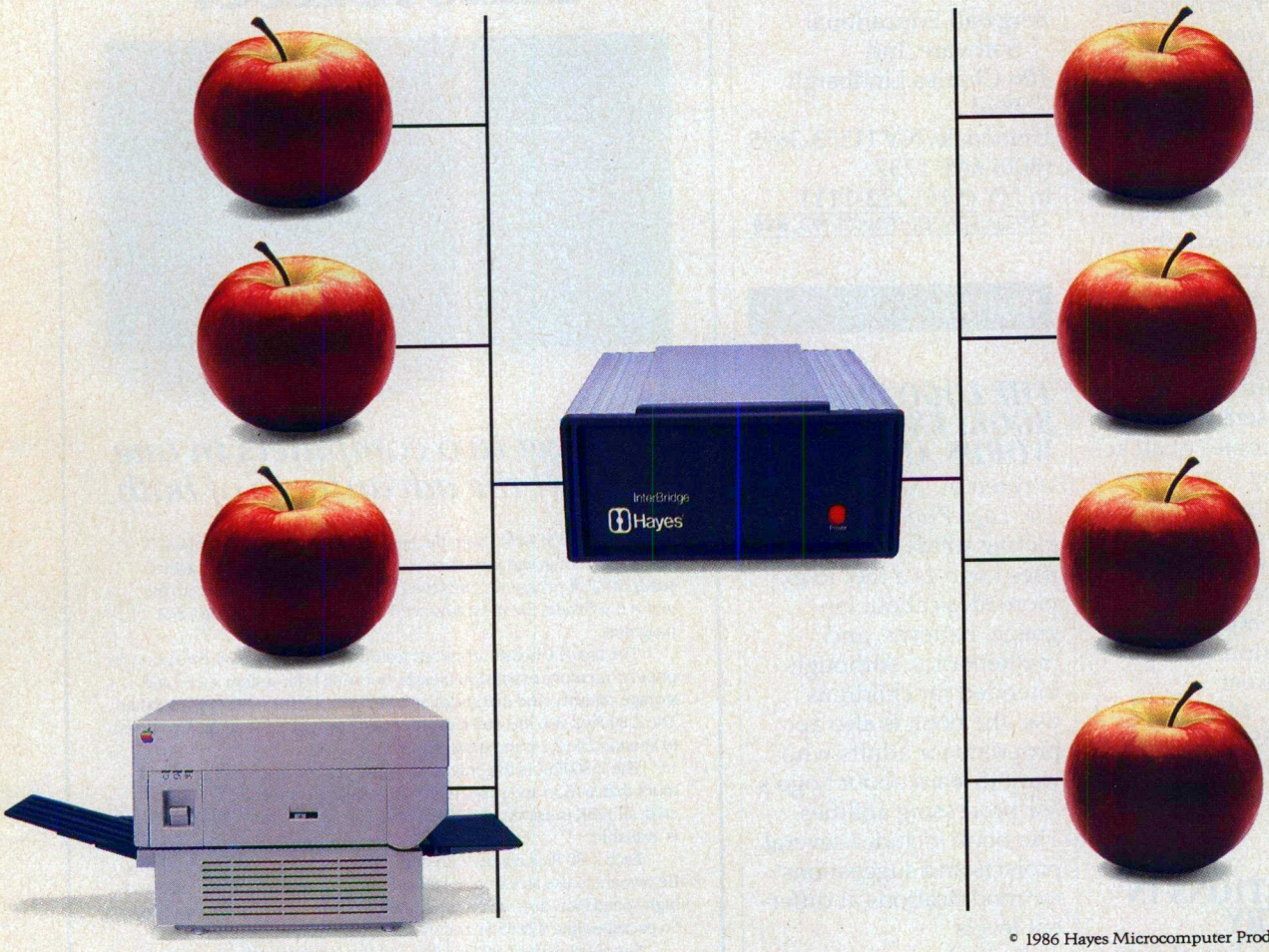

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Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Georgia 30092.

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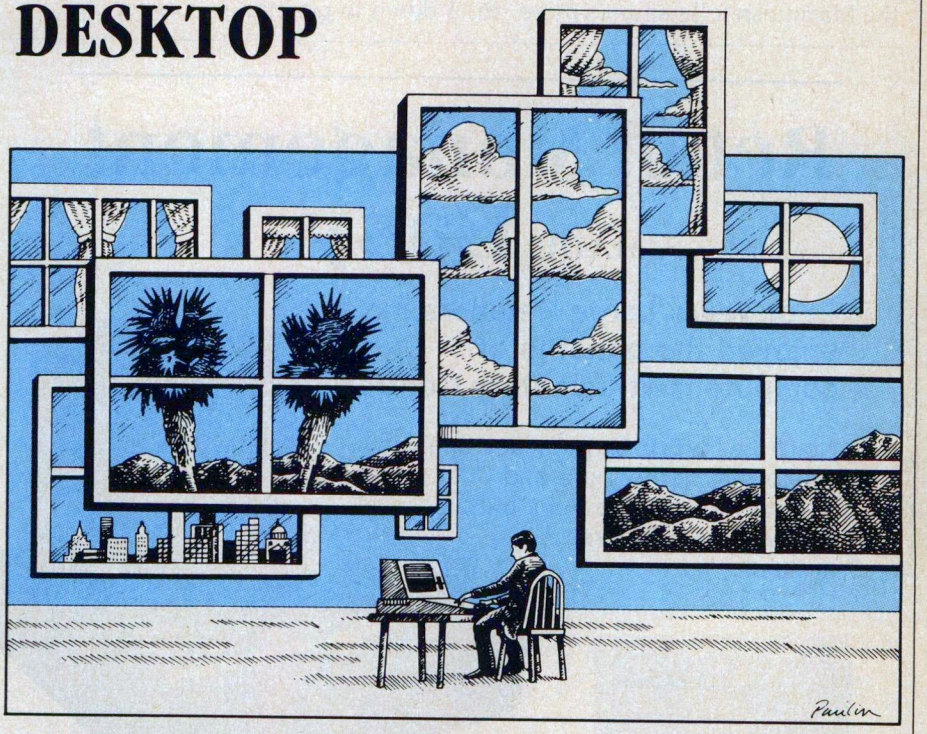
BY STEVE ROSENTHAL

PUTTING THE DESKTOP IN ITS PLACE

The converging path of the Apple II and the Macintosh



Add a graphic desktop program to an Apple II, and you get (choose one): an easier-to-use machine; a second-rate Macintosh; another way to access your programs; or a trendy appearance without improved performance. You'll find Apple II and Mac owners who advance each of the above descriptions and can give you a good argument for their position.

Apple itself is firmly in the pro-desktop camp now. For strategic marketing reasons, the company is committed to bringing the II and Mac product lines closer together, and the user interface is just as important as hardware or software compatibility.

Apple, quite naturally, is also interested in creating a recognizable product look and feel. Either of those considerations alone would be enough to motivate Apple's backing of Catalyst (domestically) and MouseDesk (internationally), both of which provide a Macintosh-like desktop for Apple II machines.

There's more to this issue, though. Graphic desktops are a different mental outlook or metaphor, a different way of looking at human/computer interaction. They're also, in a strange way, more fitting even for the II than they are for Apple's other line of computers. And, as we shall see, they're part of a lesson the II can teach as well as one it can learn.

Actually, though, two very different types of desktop programs are available for the II, playing two very different roles in the system. Catalyst and MouseDesk are limited operating environments, acting with the ProDOS operating system to find and start other computer programs. On the other hand, programs such as Jeeves and Pinpoint are tool and accessory sets for office applications.

Consequently, you normally use the first type of desktops *before* you run your usual application programs. Once an application is running, the desktop gives up control and doesn't reappear until you quit the application and return to what would otherwise be the ProDOS system prompt.

Graphic desktops are a different way of looking at human/computer interaction.

The second group of desktops, in contrast, run *during* your programs, as pop-up and pop-down windows that are always lying in wait. They are thus two steps removed from the first group and may or may not use a graphic interface.

On the Mac, the groups are closely related because tools and accessories are accessible from menu bars, which remain active and available during the use of application programs. The tools available before you launch an application program remain the tools during program execution.

That situation isn't possible on the II, however, because of the more limited role of the operating environment. Whereas the Macintosh operating system was written before the appearance of any Mac application software, leaving a clear set of rules for application programs, the Apple II desktop environments were written after most Apple II application programs and thus have to take programs as they find them.

Environmental Concern

For now, though, let's put aside the tool-type desktops and take a closer look at the first type of desktops, the

ILLUSTRATION BY DOUG PAULIN

operating environments. Most first-time Apple II users prefer the icon-and-mouse approach to the ProDOS command-line method, especially now that most first-time buyers are not computer fanatics but people who see the machine as a means to a goal.

Users find seeing what is on a disk by clicking the mouse over an on-screen image easier than worrying about giving commands and remembering paths or slots and drives. As the Macintosh folks say, it's more "intuitive." That advantage will also increase as the II continues to get more capacious storage choices and a wider range of peripheral types. Although the ProDOS operating system insulates users from changes in the hardware much more than did the prior DOS 3.3, you still have to deal with complex mental constructions to use ProDOS to access multiple files on different volumes. The differences between the graphical interface and the command-line approach boil down to position vs. conception.

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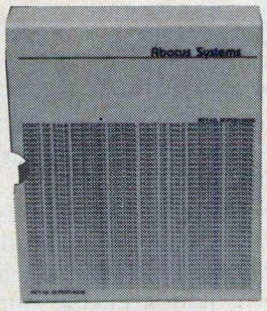

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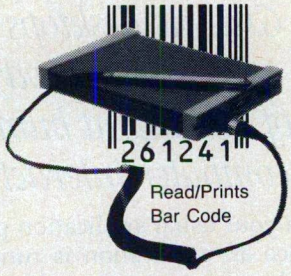

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CIRCLE 114 ON READER SERVICE CARD

Even for more advanced users, the mouse point-and-click method has its advantages. Copying disks, for example, is much easier with Catalyst than it is with the multilevel menu system of the ProDOS Filer utility, for instance.

A Mixed Blessing

The graphical approach is not entirely an improvement, however. Some of what desktops gain in ease of use comes at the cost of a more rigid approach. Desktops, for example, don't do very well with self-starting applications. Even though part of the impetus for creating software that boots and runs may have been the difficulties many users had with the command-line interface of the plain operating system, most of us have a whole collection of this software. There's not much point in running a desktop if you normally launch into programs by rebooting.

Desktops also have trouble distinguishing programs from data. Because ProDOS keeps track only of a few special kinds of files, a desktop can't normally tell if an unmarked file contains instructions for you, for an application program, or for the operating system.

You can tell the desktop which files are which by installing the programs, but if you're doing a lot of changing around of disks and running a lot of files through the system, you have to do a lot of installing and removing to keep your system up to date. If you stick with plain ProDOS, you can just swap disks.

Desktops can also get in the way of full communication between you and your program. The point-and-click model doesn't provide any good means of giving an application program an initial set of parameters or of setting options from a command line. Similarly, they give you only a limited ability to set up macros or record procedures, so you must do most desktop tasks one step at a time.

The limited scope of the Apple II desktop programs can also be a problem. Because the desktops cede complete control to application programs, the desktop environment doesn't provide any consistency for the application's user interface. Not only does this mean that each application can have its own different interaction style, but it means the desktop becomes one *more* program you have to learn and remember.

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edged sword, and one of the attractions of the Apple II line has always been its variety of software and the range of available approaches. If you take word processing, for example, you'll find dozens of software choices on the II, one of which probably suits any particular work style and mental orientation. On the Mac, however, you'll find only a handful of word-processing programs, and most work in about the same way.

Pick and Choose

Still, some optional standards would be nice. International Solutions, the publisher of MouseDesk, has come out with a line of business programs that use the same interface as the company's desktop software, and other programs such as Roger Wagner's MouseWrite and Trutec's Person to Person telecommunications program also use a Mac-like approach. But so far, no announced program from Apple or anyone else ensures a consistent desktop and application-program user interface.

I believe the optional-standard approach is particularly fitting for the II series, because it continues the tradition of an open but supported architecture. Although, in electrical terms, you can put most cards in most slots in an Apple II, in most cases you want to go with the standard arrangement. If the circumstances call for another arrangement, though, it's no big deal to do it a nonstandard way. Desktop-related program-interface standards should be the same way.

In fact, having a graphic desktop as the operating-system interface should be an option. At times you can get more done with a command line or perhaps a menu-driven operating-system-shell program. The engineers of the Macintosh—who originally assumed that users didn't need open-ended choices, only limited numbers of predefined selections—seem slowly to be learning that lesson.

So watch not only how the II desktops evolve over the next year or two, but also the Macintosh itself. The II may become more Mac-like, but you'll also see more II-like features on Mac desktops.

Shall we say that the Mac's lesson is graphical interfaces and software consistency? In that case, the II stands, as always, as a beacon on the virtues of openness and configurability. And that's nothing to keep permanently hidden under anybody's desktop. ✚

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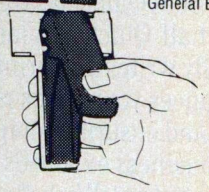

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CIRCLE 108 ON READER SERVICE CARD

Rescue Squad

BY CHRIS VAN BUREN AND GARY B. LITTLE

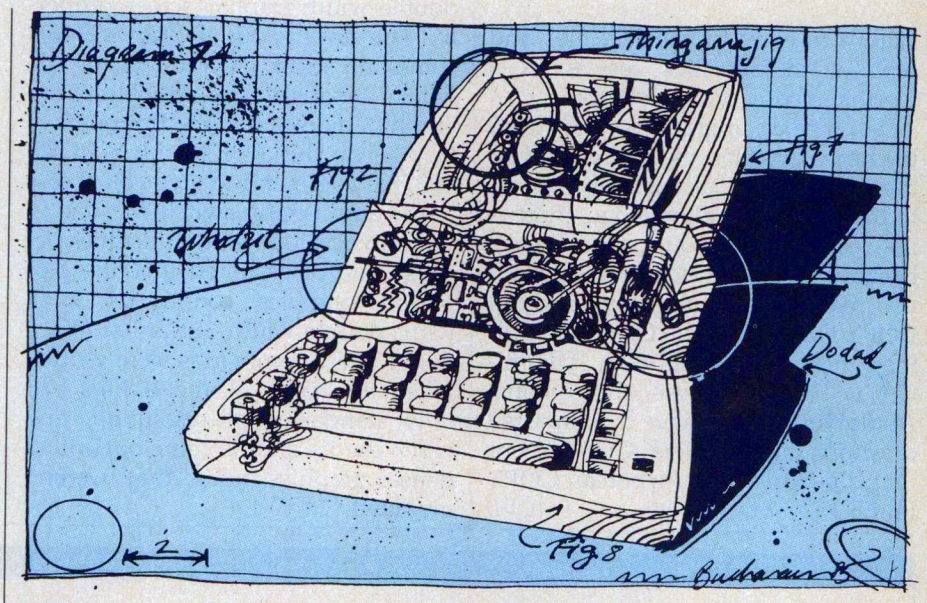
APPLEWORKS VERSIONS CONFUSING

Q. *I own AppleWorks, Version 1.1. I went to my dealer for the 1.2 upgrade, and he had no data, specifications, or anything to explain what changes had been made. The copies he made for me would not run on my IIc, so he recopied them. The new copies were OK, but now I find I cannot make backups with my IIc utilities disk. Why can't I make backups as I could with my original 1.1 version, and what are the differences among the 1.1, 1.2, and 1.3 versions?*

A. Version 1.0 was replaced by Version 1.1 after only a few months. Version 1.1 contained a new manual to accommodate IIc owners (this version was introduced with the IIc) but was found to have problems with non-Apple parallel printer cards. It seems that most printer-card manufacturers emulated Apple's older-style cards that were created with BASIC programs in mind. These cards automatically sent a carriage return at the end of each 80-character sequence. Unfortunately, ProDOS doesn't want those carriage returns, and they can cause problems in ProDOS programs such as AppleWorks (one symptom was that 80N printed mysteriously at the top of the page).

Version 1.2 overcame the non-Apple parallel-card problems by allowing you to issue control commands to the card itself, telling it to turn off the automatic carriage return after 80 characters. The procedure involves entering the Other Activities option from the main menu and then selecting the Specify Information about Your Printer(s) option. Next, you choose your printer under the Change Printer Specifications option and select the Interface Cards option. You can now change the card's automatic carriage return from 80 to 0 by entering the code Control-I ON.

Version 1.2 of AppleWorks also added new printers to the Select Printer option and overcame problems with the underline and boldface codes on the Epson MX printers. Memory upgrades from various manufacturers come with software that modifies this version to allow it to recognize extra memory, and most of them work quite well. Quark's Catalyst, Versions 2.0 and 3.0, also work with Version 1.2.



If you have Apple's Memory Expansion Card in your computer, Version 1.3 of AppleWorks will increase the desktop from 55K to about 800K.

Version 1.3 adds some minor features to AppleWorks: It recognizes the UniDisk 3.5 as a disk drive, so you don't have to type pathnames to locate information on a 3.5-inch disk, and it lets you format a disk within AppleWorks so you don't have to use the system utilities. If you have Apple's Memory Expansion Card in your computer, this version will increase the desktop from 55K to about 800K. It will not, however, increase the record limit in the database program, the size limit in the spreadsheet program, or the line limit in the word-processing program (Apple maintains that it will soon increase these limits).

Currently, memory upgrades from other manufacturers increase these limits, but they work only with Version 1.2 of AppleWorks. Version 1.3 is the only upgrade that is not free from dealers. It costs $20 from Apple, unless you purchase a Memory Expansion Card, in which case it's free. It is also the only version with an addendum to the manual.

When dealers upgrade your existing disks, they simply copy certain files from the new version, adding new ones and replacing any with the same name. The 1.2 upgrade consists of these files:

ILLUSTRATION BY YVONNE BUCHANAN

AppleWorks.System (program code)
Seg.M0 (memory-resident code)
Seg.M1 (memory-resident code)
Seg.PR (printer information)
Seg.00 (booting and loading code)

The 1.3 upgrade consists of these files:

AppleWorks.System
Seg.M0
Seg.M1
Seg.PR
Seg.00
Seg.XM (extra memory code)

Failure to copy the correct files and replace existing files results in a worthless copy of AppleWorks.

So, if your upgrade contained all the necessary files and you copied all the required files, as explained above, to the best of my knowledge, there is no reason why you cannot make backups with your IIc utilities disk. If you made your backup by choosing COPY FILES from the IIc system utilities menu, you might try DUPLICATE DISK, because the original AppleWorks disks have a compacted directory, and the DISK COPY keeps that directory intact, whereas COPY FILES will not. —*CVB*

APPLESOFT AND DOUBLE-WIDTH GRAPHICS

Q. *I read in your* Inside the Apple IIe *book that you can turn on double-width high-resolution graphics from Applesoft by following a PR#3 command with HGR and POKE 49246,0 commands. I've done this, but my line-drawing program doesn't seem to work properly. For instance, when I draw a horizontal line with HPLOT, I get a dashed line instead of a solid line. Can you tell me what I am doing wrong?*

A. You are certainly enabling the double-width graphics screen properly. The mysterious POKE 49246,0 command turns on annunciator #3, which enables the double-width graphics modes. (On the IIc you have to precede this POKE with a POKE 49278,0 command to give you access to the annunciator switch.)

You've encountered difficulties because you've assumed that the Applesoft graphics commands work with double-width graphics. They don't! These commands were written when the Apple II and II Plus had only standard high-resolution, and when the IIe and IIc came out with a denser graphics mode, they weren't modified.

The reason you see a dashed horizontal line is that every graphics row on the screen is mapped to an interleaved series of 40 bytes in main memory and 40 bytes in auxiliary memory. (Each byte defines 7 adjacent pixels.) When HPLOT draws a line, it stores data in main memory only, so there are gaps for the pixels that correspond to auxiliary memory bytes.

The solution is not a happy one for Applesoft programmers: Write your drawing routines in assembly language. This is not simple, but it's about your only choice until Apple decides to rewrite Applesoft.

If possible, get your hands on a superb article entitled "True Sixteen-Color Hi-Res" by Allen Watson III. It appeared in the January 1984 issue of *Apple Orchard*, and it describes a set of subroutines you can call from Applesoft in order to use double-width graphics efficiently. If you aren't able to locate this issue, contact the publisher, International Apple Core, at (408) 727-7713. —*GL* ✚

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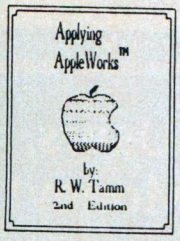

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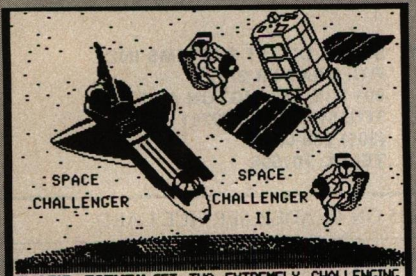

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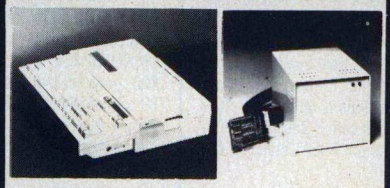

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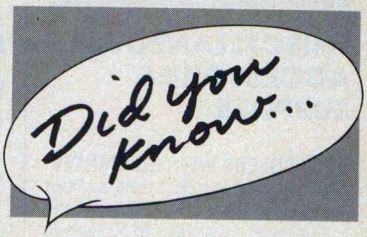

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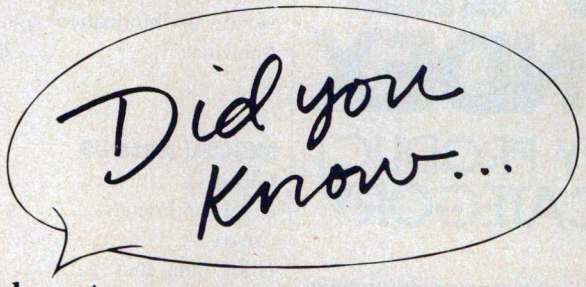

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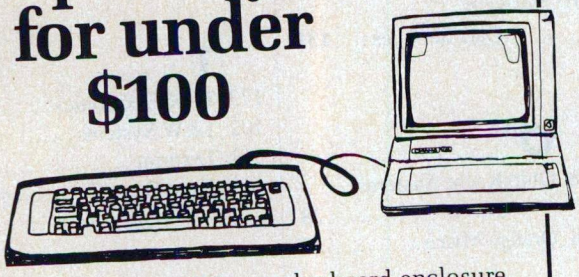

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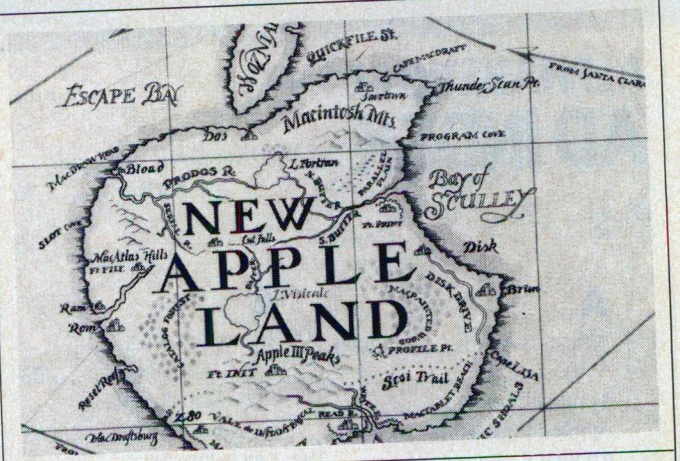

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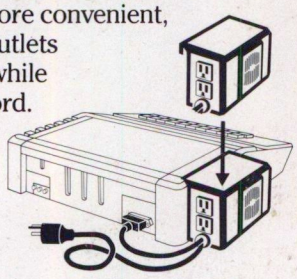

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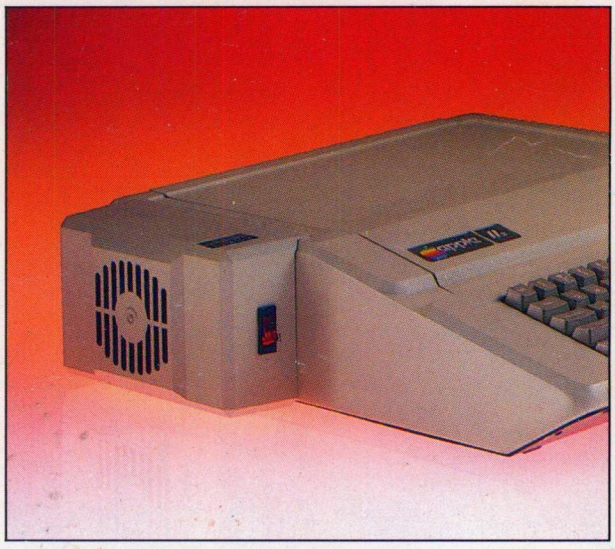
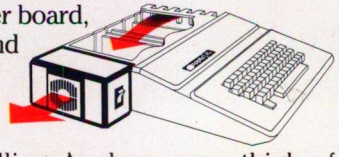


System Saver's quiet fan draws a breath of fresh air across the Apple's mother board, over the power supply and out the side ventilation slots at the rate of 17 cubic feet per minute.



More than 1/4 million Apple owners think of System Saver as the piece Apple forgot. And 1/4 million well-protected Apples agree.

For a dealer near you, or to speak to a Kensington sales representative, call toll free (800) 535-4242 In NY (212) 475-5200.

KENSINGTON™

CIRCLE 134 ON READER SERVICE CARD

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Also available in 220/240 Volts, 50/60 Hz.

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